IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	Docket No.: **TI-20567**
LaVaughn F. Watts Jr.	Art Unit: **2112**
Serial No.: **08/568,904**	Examiner: **Meyers, Paul R.**
Filed: **12/07/1995**	Conf. No.: **7575**

For: **REAL-TIME THERMAL MANAGEMENT FOR COMPUTERS**

DECLARATION OF PRIOR INVENTION IN THE UNITED STATES TO OVERCOME CITED PATENT - 37 C.F.R § 1.131

Dear Sir:

I, LaVaughn F. Watts Jr., do hereby declare:

1. I am the inventor of the above-cited invention.

2. I submit this declaration to establish conception of the invention in this application in the United States on a date prior to October 11, 1994, which is the effective date of the cited U.S. patent to Dischler et al.(6,311,287)(newly cited by the Examiner in the Office Action dated May 13, 2005), and diligence in reducing the invention to practice from a date prior to October 11, 1994, which is the first effective date of cited U.S. patent to Dischler et al. (6,311,287), until the invention was actually reduced to practice on or before a date no later than December 15, 1994.

3. To establish the date of conception of the invention of this application prior to October 11, 1994, I submit true copies of the following documents:

EXHIBIT A - Copy of a slide presentation titled Notebook Strategic Business Unit Roadmap Key Technology Approach which I prepared on March 23, 1994 for presentation to TI upper management. It was my intent to commercialize the present invention, at least as of March 23, 1994, in a future TI laptop computer identified as project Lilyp which laptop would incorporate an Intel Pentium processor. Slide 1 discloses the Pentium processor as a P54C-100MHZ. Slide 2 identifies the project as "Pentium Notebook". Slide 3 discloses the notebook project as "Lily – 10.4 – Pentium 100MHz". Slide 8 discloses that the notebook project will have "heat management systems". Slide 9 discloses "TCP with Heat control". Slide 13 discloses "less heat – without fan;

EXHIBIT B – Copy of program DATA.ASM that I created on May 4, 1994 that was related to the present invention, that was to be implemented with Chicago (codename for Microsoft Windows 95);

EXHIBIT C – Copy of program BADATA.ASM that I created on May 4, 1994 that was related to the present invention, that was to be implemented with Chicago (codename for Microsoft Windows 95);

EXHIBIT D – Copy of program CHICAGO.INC that I created on May 4, 1994 that was related to the present invention, that was to be implemented with Chicago (codename for Microsoft Windows 95);

EXHIBIT E – Copy of e-mail message (08/30/94) from Mark Rendon to lily folks (of which Vaughn Watts was a recipient) which sets forth under "Notebook actions" & "Tasks", that Vaughn Watts was under #23 to have BatteyPro and SMI heat management ready on 09/15/94;

EXHIBIT F – Message from Jack Rawls to Dennie Shadrick (09/02/04), with copy to Vaughn Watts, identifying Project Milestones for Lilyp – Engineering models were due

09/23/94; Pre-production was due 10/14/94 and Mass production was due on 10/24/94. Page 2 of the document states "the testing (on completed Lilyp sample) yielded valuable data on thermal profiles";

EXHIBIT G – Copy of SWDEV Heat programs showing that I met the time table of 09/15/94 in EXHIBIT K above – see HEAT.BAT last modified on 09/14/1994;

EXHIBIT H - Copy of a slide presentation titled Notebook Strategic Business Unit Roadmap Key Technology Approach which I prepared on September 22, 1994, which was an update of my slide presentation dated March 23, 1994 for presentation to TI upper management (see EXHIBIT A). Most of the slides are repeats, with exceptions that slides 1 and 2 now identify the "Pentium Notebook" as being a "Lily Notebook". Slide 2 disclosed that the Lily Notebook Pentium-90, (i.e., Lilyp) predicted commercialization date has slid from late in 4Q94 to early 2Q95. Much of the remainder of the presentation is a repeat from EXHIBIT A;

EXHIBIT I – Copy of NewFile=Trange.INC which lifted and recoded on (10/14/94) which is relevant to the invention. {NOTE: changes made to the program after 10/14/94 to improve functionality are dated per the change date}.

EXHIBIT J – Copy of e-mail message from Sandeep Bhadsavle to Vaughn Watts (11/02/94) informing Vaughn that the "2nd IO channel 54h (cmd/sts just like 64h) & 50h (data just like 60h) is now functional (which was channel from which to read CPU temperature). Also note the fourth line from the bottom which states, "all comdex units will have this upgrade";

EXHIBIT K – Copy of e-mail message from Sandeep Bhadsavle to Vaughn Watts (11/03/94) encouraging Vaughn to write to 64h and read data 60h for response. And

responsive message from Vaughn Watts to Sandeep telling him that I tried to read the cpu temp (second ad channel) using the c4h command with no luck;

EXHIBIT L – Copy of document showing that "Read A/D support on 54/50 added" (Released 11/08/94). This is important since this change allowed my invention to work as designed;

EXHIBIT M – Copy of Vaughn Watts expense report for the dates 11/11-17/94 for trip to COMDEX convention in which I took an engineering model of a laptop computer that incorporated the invention in order to show it (under Non-Disclosure Agreement only) to suppliers and potential customers. The invention was reduced to practice in the engineering model as of this date;

EXHIBIT N - Copy of SWDEV Heat programs. With the exception of one ZIP file, all were completed prior to 11/09/94;

EXHIBIT O – Copy of pages 2, 17, 20, 21 and 23 of a document entitled "Lily Keyscan Board Specification – Revision 2.4 – November 16, 1994", which shows that CPU and battery temperature were being detected and evaluated;

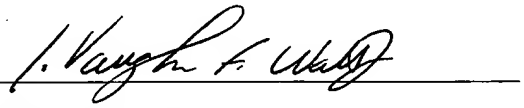
EXHIBIT P – Copy of FILE=Thermal.Equ (dated 12/15/94) as disclosed on page 44 of the present application. Line TP1 confirms that equ 50;90 was tested. This is evidence that a version of the invention intended for deployment in a commercial product was working as of this date.

4. I hereby declare that I conceived the invention (see Exhibits A & H) on a date prior to October 11, 1994, which is the first effective date of cited U.S. patent to Dischler et al. (6,311,287). Thereafter I worked diligently on reducing the invention to practice in a timely and orderly manner (see Exhibits B-G & I-O) from at least one day prior

to October 11, 1994, which is the first effective date of cited U.S. patent to Dischler et al. (6,311,287) until the invention was actually reduced to practice. While I believe my invention was actually reduced to practice no later than November 8, 1994 in the engineering notebook model I took to COMDEX on November 11, 1994, for the purposes of this declaration I will rely upon an actual reduction to practice date of December 15, 1994 (see Exhibit P).

6. This declaration is submitted prior to final rejection and is submitted at Applicant's first opportunity to respond since the Dischler et al. reference was first cited in the Office action dated May 13, 2005.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.



LaVaughn F. Watts Jr.

Date: 11/12/2005

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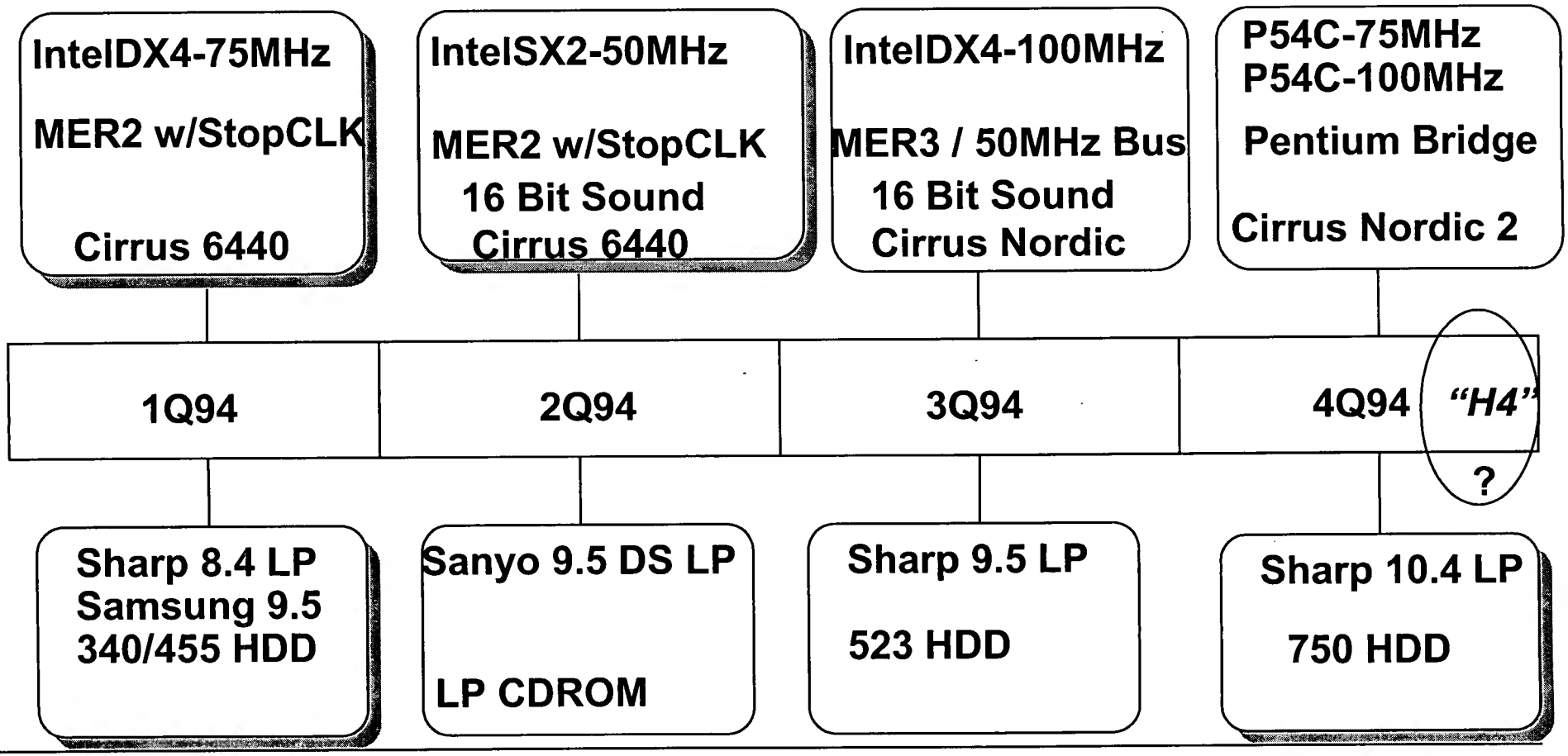
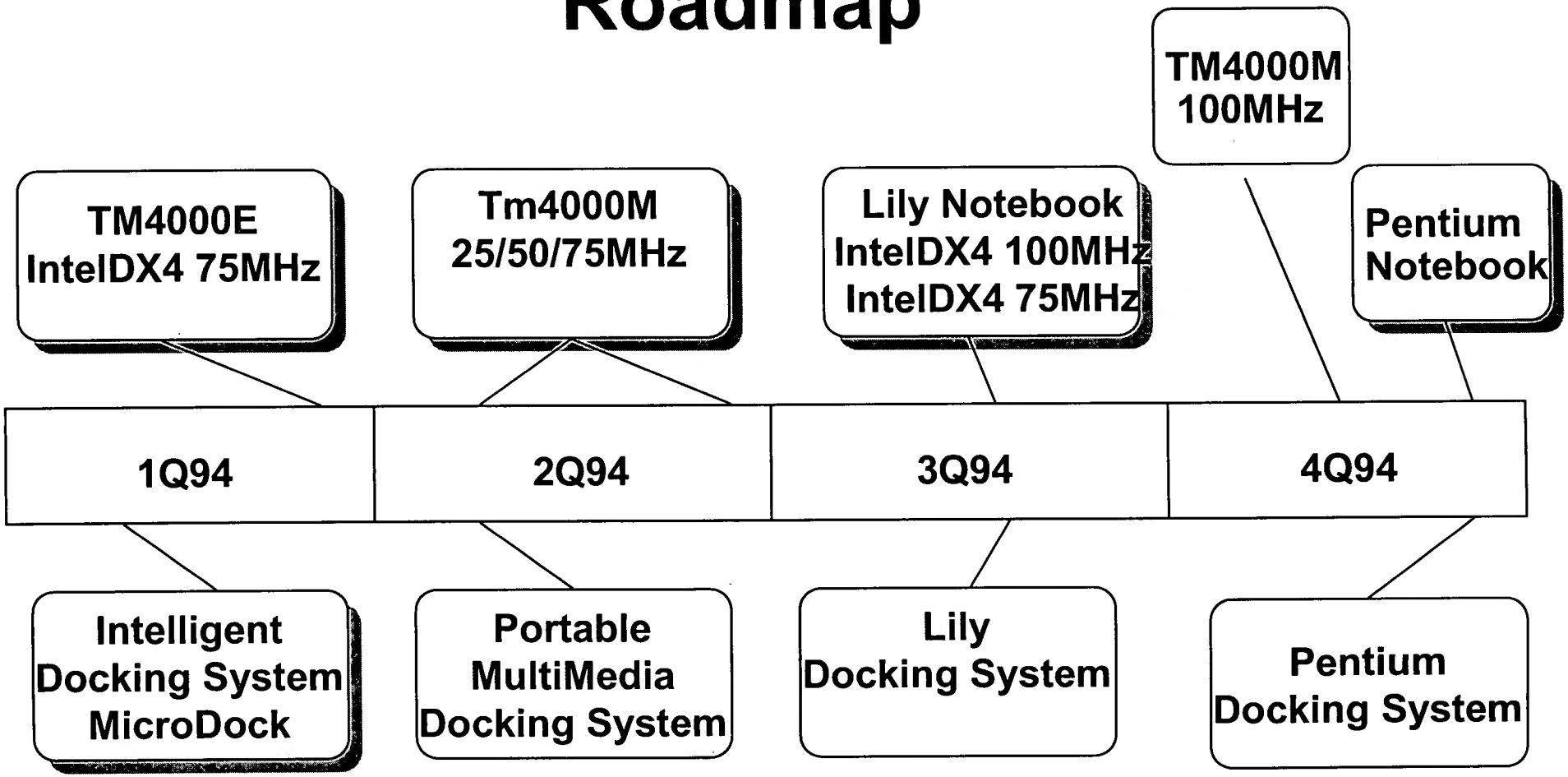
Notebook Strategic Business Unit Technology Roadmap



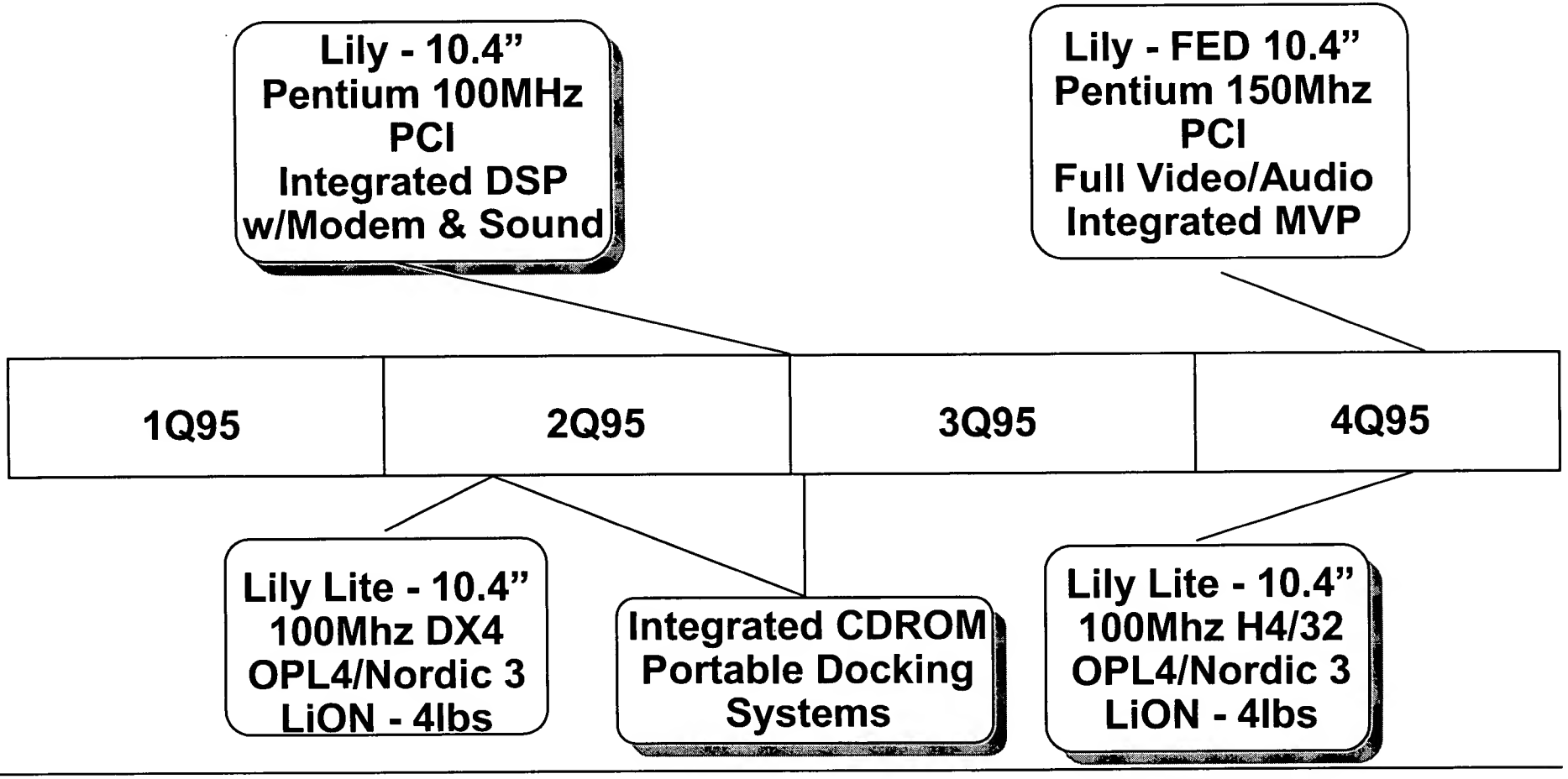
Texas Instruments

Notebook Strategic Business Unit Roadmap



Texas Instruments

Notebook Strategic Business Unit Roadmap



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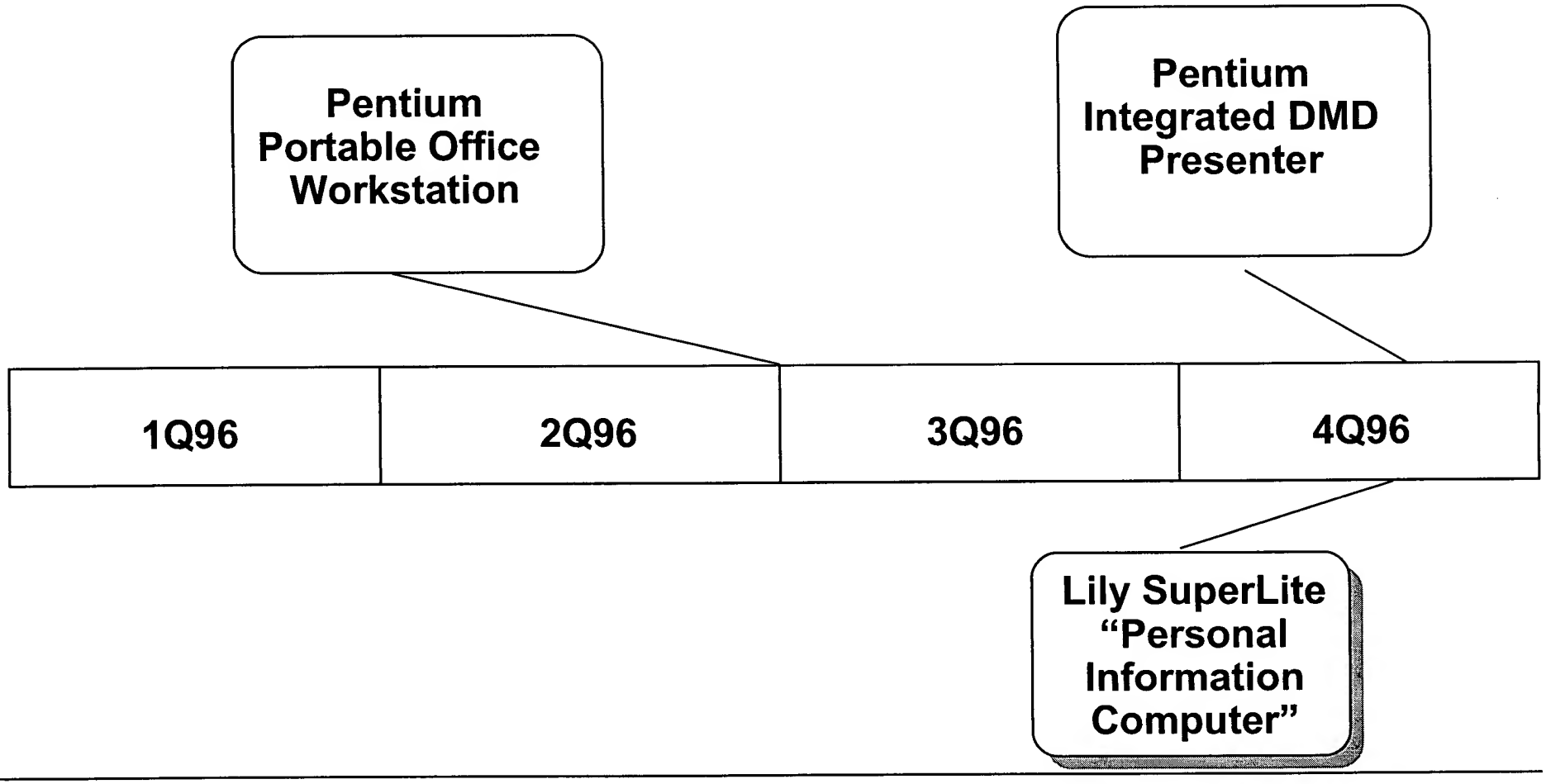
Notebook Strategic Business Unit Roadmap



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Notebook Strategic Business Unit Technology Roadmap

"H4" ?

IntelDX4-75MHz	IntelSX2-50MHz	IntelDX4-100MHz	P54C-75MHz P54C-100MHz
MER2 w/StopCLK		MER3 / 50MHz Bus	Pentium Bridge
1Q94	2Q94	3Q94	4Q94
Cirrus 6440 Sharp 8.4 LP Samsung 9.5	Sanyo 9.5 DS LP	Cirrus Nordic	Cirrus Nordic 2 Sharp 10.4 LP
340/455 HDD		523 HDD	750 HDD
	16 Bit Sound / OPL3 LP CDROM		16 Bit Sound / OPL4

Notebook Strategic Business Unit Strategic Issues

- Time to Market with Pentium Notebook
  - Compaq will market "A4" size Pentium Notebooks with FAN - 4Q94
  - Toshiba will market Pentium Notebooks - 4Q94
  - Some annoucements of "A4" with FANs -June/July 94
  - Chip Sets available by 4Q94

- Lily Lite Product Market Requirements
  - Dockable, Plug n' Play, PCMCIA
  - Light with power CPU (~75/100Mhz)
  - Only major player without Subnotebook

- PCMICA / Dockable/ Plug n' Play
  - Current product line lacks PCMCIA
  - Current product line lacks Hot Docking

Notebook Strategic Business Unit Key Technology Approach

- Industry Direction - Faster processors with wider and faster bus architectures built around the Intel SL Enhanced CPU Power Management (SMM) interface continue to force total system design to understand key technical and market attributes:
  - Wider bus moving from 32 bits to 64 bits.
  - Faster bus requirements for VL-Local Bus to new PCI bus.
  - PCMCIA bus will be used for IO functionality independent of CPU bus.
  - Pentium Core and Bus in combination with DX4 Core and Bus will move CPUs to various 32 and 64 bit combinations.
  - CPU technology will be available to the key computer makers at the same time.
  - Differentiation will be available to computer makers *but not at the CPU component level.*

Notebook Strategic Business Unit Key Technology Approach

- **TI Direction - Differentiation must be made at the system level rather than at the CPU or component level. Key successful differentiation will be built around system architectures with the same engine as all other computer makers.**
  - Memory systems
  - Power management and Heat management systems
  - Video and Audio systems
- **Key supplier and co-development of technologies available at or ahead of competition availability.**
  - Displays (Sanyo/Sharp/Samsung/FED-TI)
  - Audio/Sound (Media Vision/US Robotics/TI)
  - Video (Cirrus and PPP [TI] co-development)
  - Memory (Samsung/TI/RAMTRON)
  - Core Logic (PPP[TI]/AT&T/Others(?))
  - Software (Phoenix, Microsoft, Media Vision, Cirrus, US Robotics)
  - Batteries(Energizer), Pointing (IBM), HDDs (Seagate), Keyboards (Brother)

Notebook Strategic Business Unit Key Technology Approach

- Key Components to Differentiation
  - Core Logic
    - BatteryPro architecture (power management) H/W & S/W & BIOS
    - Video controller interface integration (PPP[TI]/Cirrus)
    - High speed memory systems (EDRAM/SCD)
    - Elimination of interrupt latency (BatteryPro)
    - Plug n' Play, Hot/Warm Docking, Smart & Intelligent Docking
    - Power Management for new devices (Sound/Audio)
  - Display, Power, Video, Audio Systems
    - Access to key subsystems combined with PPP [TI] power management
    - Integration with BatteryPro, Power Systems, and custom control
    - Advanced package capability such as TCP with Heat control

Notebook Strategic Business Unit Technology Trend Summary

- **Software** - Continuous development for multi-tasking/session OS/GUI
  - Consuming more memory, CPU cycles, Video Cycles
  - Requiring more disk storage
  - Scaleable across display resolutions
  - More utilities moving into core OS
  - MS-DOS being replaced by Windows Operating Environment
  - Plug n' Play required in basic OS & BIOS
  - Power Management (APM) standard
- **Processor** - Continuous development of higher performance CPUs
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management Interface (SMM)
  - Faster Bus (ISA - VL - PCI)
  - Co-processor (Math)

Notebook Strategic Business Unit Technology Trend Summary

- **Memory** - Continuous development for higher performance CPUs
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management (5V - 3V)
  - Faster Bus (Synchronous, EDRAM, RAMBUS)
  - Cache Systems (12-15 ns)

- **Proprietary ASICs**- Continuous development for higher performance systems
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management (5V - 3V)
  - Faster Bus (Synchronous, EDRAM, RAMBUS)
  - Cache Systems (12-15 ns)
  - Integration with BatteryPro system architecture
  - SMM vs. Interrupt latency

Notebook Strategic Business Unit Technology Trend Summary

- **Storage** - Continuous development of higher performance HDDs
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management, Lower Power (5V - 3V)
  - Faster Bus (ISA - VL - PCI)
  - Low Profile (19mm - 12 / 10 mm)
  - Lower weight (7 oz. - 5 oz.)
  - Smaller (2.5" - 1.8")
  - New head technology (Thin film - MR)
- **Display** - Continuous development for higher quality displays
  - Faster refresh (300 ms - 250 ms - 100 ms - 50 ms)
  - Power Management (5V - 3V)
  - Lower Power, Brighter Displays
  - STN DS Color, TFT, Active Addressing, FED
  - Movement to larger displays (8.4" - 9.5" - 10.4")
  - Movement to smaller displays (8.2" - 7.8" - 7.5")
  - Better / larger / greater resolutions (VGA - SuperVGA)

Notebook Strategic Business Unit Technology Trend Summary

- **Battery** - Continuous development of higher capacity batteries
  - NiCAD - NIMH - LiON
  - Longer life (recharge cycle time, number of times)
  - Smart batteries (charger and memory imbedded)
  - Low Profile (4/3 A's, 6, 10, or 12 cell packs)
  - Lower weight, higher density, more power
  - Standard package size, off - the - shelf package (Compaq)

- **Power Systems-**
  - Smart battery chargers & integrated memory systems
  - Multi-voltage, auto-sensing
  - Less heat, better integration (smart cords), internal w/o Fan
  - Processor controlled (Power on/off under OS control)
  - Smaller size, faster charge

Notebook Strategic Business Unit Technology Trend Summary

- Video Systems- Continuous development of higher performance video
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management, Lower Power (5V - 3V)
  - Faster Bus (ISA - VL - PCI)
  - Live Video/Audio integration
  - Higher resolution, more colors (4 - 8 - 24 bit color)
  - Graphic Acceleration & Color Expansion
  - Generic Drivers - out-of-the-box support
  - Docking system / PCMCIA interface

Notebook Strategic Business Unit Technology Trend Summary

- Input Devices - Continuous development ease of use interfaces
  - Longer key travel (2mm - 3mm - 4mm)
  - Integrated TrackPoint
  - Lower cost, higher reliability pointing device
  - Lower weight, smaller size (subnotebooks)
  - Handwriting / pen input
  - Wireless

- Communications- Continuous development of higher integration features
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management, Lower Power (5V - 3V)
  - Faster Bus (ISA- ISA/PCMCIA - PCI - PCI/PCMCIA)
  - Type III and Type II PCMCIA form factor
  - Longer distance (12V interface)
  - Higher integration (Modem/FAX/LAN single PCMCIA)
  - Integrated DAA / XJACK / Single Cable

Notebook Strategic Business Unit Technology Trend Summary

- **Packaging** - Continuous development total packing concepts
  - SMT - BGA - TAB(TCP)
  - Heat management
  - EMI shielding
  - Lower weight, better strength material
  - Flexible & Modular packaging (NEC Versa)
  - Higher Integration

Notebook Strategic Business Unit Technology Trend Summary

- Docking Systems-
  - Power Management, Lower Power (5V - 3V), EPA Green
  - Faster Bus (ISA - VL - PCI), Docking Bus
  - Multi-docking (Microdock/ CDROM Portable Dock/ Desktop)
  - Plug n' Play
  - Hot / Warm Docking
  - Higher integration
  - New interfaces (Video Feature connectors, etc)
  - Smart/Intelligent Microprocessor controlled
  - Intelligenent OS integration

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Notebook Strategic Business Units Technology Relative Access Summary

Technology	Compaq	IBM	Toshiba	AST	TI
Processor	+	+	+		+
Memory					
Core Logic			+		+
Storage		+	+		+
Display		+	+	-	
Battery	+	+	+		+
Power Systems			+		+
Video Systems	-		-	-	+
Audio Systems	-	+		-	+
Input Devices		+	+		+
Communications	+	+	+		-
Software	+			-	+
Packaging			+		
Docking System	+		+	-	+

```
;
;FILE=DATA.ASM
;Added Code for Chicago (Watts 5/4/94)
;
idletick        dw      0       ; driver tick count period
timertick       dw      0       ; driver tick count, power level 2/3
keyboardtick    dw      0       ; driver tick count, power level 1..4
power_level     db      0       ; Level for power saver
dos_power_level db      0       ; Level for power saver, DOS 5.0
Maxpower_level  db      0       ; Level for max power usage
busy_int2f      db      0       ; busy flag for int 2f
busy_int28      db      0       ; busy flag for int 28
busy_int21      db      0       ; busy flag for int 21
quite           db      0       ; Hide/Quite/MS DOS 5.0 flag
WinSX           db      0       ; WinSX or Standard Version of S/W.
                                ; 0 = WinSX, BUSY_FLAG = Standard
supdev1         dw      0               ; Word 11 from f95f call
supdev2         dw      0               ; Word 12 from f95f call
cputype         db      30h             ; type of CPU we have

wntstk          dw      128  dup(11h)    ; define interrupt stack
wstack          label   word            ; define top of interrupt stack
                dw      0               ;

ac_parms        db      (DEFAULT_AC)    ; Skip real-time on AC or not.
cpu_parms       db      (DEFAULT_CPU)   ; TYPE OF CPU
exp_parms       db      (DEFAULT_EXP)   ; Is Exp Bus attached?
sound_parms     db      (DEFAULT_SOUND) ; Is sound attached to expansion bus
exp_bus         db      (DEFAULT_EXP)   ; Is Exp Bus attached?
ESeries         db       86h            ; No eseries
PBCountValue     db      0
PBValue1         db      0
PBValue2         db      0
PBValue3         db      0
PBType                   db      0      ; Type system (=2 Paintbrush)
sleep_tick_count        dw      0
ONE             db      1
TWO             db      2
TEN             db      10
TWENTYFIVE      db      25
ONEHUNDRED      db      100
```

EXHIBIT B

```
;
;FILE=BADATA.ASM
;Vaughn Watts 2/23/92
;Coded for Chicago 5/4/94 Watts
;=============================================================================
DC_Second       dw      SECOND_RELOAD   ;Downcounter of timer ticks til sec pass
DC_Minute       dw      MINUTE_RELOAD   ;Downcounter of timer ticks til
OneSecond               db      1
FiveSecond              db      5
FifthteenSecond         db      15
ThirtySecond            db      30
ForthyfiveSecond        db      45

SystemRunTime       dw      0           ; Total Time System is On this Session
SystemTime          dw      0           ; Current system time on battery
OldState            db      0
```

EXHIBIT C

```
;
;File=Chicago.Inc
;Coded for Chicago 5/4/94 Watts

APM_EVENT  MACRO  Event
       mov byte ptr APMEVENT[&Event],&Event
ENDM
```

EXHIBIT D

R#=838 ST=C DIV=0014 CC=00584 BY=RNDN AT=08/30/94 05:01 PM

to: lily folks, *tm5

from: Mark Rendon, rndn

subj: Last Friday's action list.

Microdock actions

Tasks	People	When
1 SR LM's by eom	#Mark	#08/30/94
2 Release Microdock LM unit and pack	#Mark	#08/30/94
3 Setup I/O adapter	#Mark Lee Harold	#08/30/94
4 Release all plastic and fab part dwgs	#Grimm	#08/31/94
5 25 sets of plastics inhouse for engineering build	#Swofford Guthrie	#09/01/94
6 Complete board layout both brds.	#Verdun	#09/02/94
7 Review parts placement layout: btm brd complete, need top brd.	#Giraldo sarah S.Wallac	#09/02/94
8 Setup PAL's as programmed parts	#Verdun	#09/02/94
9 User accessible screws! define h/w	#Mark	#09/07/94
10 START Board build (20 sets)	#Parker	#09/08/94
11 complete manual	#Len	#09/15/94
12 order manuals	#Swofford	#09/15/94
13 Check on tool inserts for I/O adapter	#Grimm	#09/15/94
14 Determine mix of I/O vs uDoc	#Tonya	#09/15/94
15 Parts inhouse for 60 sets of boards	#Sandy	#09/15/94
16 Design pack box and inserts	#Earl Bro	#09/15/94
17 Define pack assy	#Mark Dan	#09/15/94
18 Do we need to ship with ac adapter? With cords too? Microdock...	#Vaughn Tonya	#09/15/94
19 Define acc. kits; manuals etc.	#Tonya Mark Dan	#09/15/94
20 Perform load analysis and power	#S.Wallac	#09/15/94

budget Dan
21 Disposition FAI's #Grimm #09/15/94
22 Complete specification #Vaughn #09/15/94
23 build engineering models #Mark #09/15/94
24 Ship I/O port with AC adpt and cord? #Tonya #09/15/94
Vaughn
25 Need plan for Comdex for I/O units #Grimm #09/30/94
Mark
26 Rearrange parts for producibility on #Gary #09/30/94
second layout S.Wallac
27 resolve ME issues (floating VGA, and #Grimm #09/30/94
docking concerns) Mark

Notebook actions:

Tasks People When
---

1 IR shortage (crystal)... need to #Kurt #09/01/94
work shortage: high priority S.Wallac
2 Review main brd changes for produci- #sarah #09/01/94
bility prior to layout L.Girald
3 Review all stds. #Rawls #09/02/94
Luecke
Purchasi
4 Need graphics for pretty box: send #Tonya #09/02/94
msg to pttz for action! Mark
Moore
5 Distribution of eng models; list #Mark #09/02/94
6 Review battery schedule/status Li- #tim #09/02/94
ion Dan
7 Review Ni-M-Hydride sch/status #tim #09/02/94
Dan
8 Create mic. extension cable dwg.... #Dan #09/02/94
Check on requirements. Do we really Steve
need this? YES
9 Complete release of memory and pack #Dan #09/02/94
assy Mark
10 Seagate needs to give us spec for #jeff #09/02/94
stop/start on 525
11 Set COST AND LABOR stds on all parts #Luecke #09/02/94
Parker
12 IR Sensor PWB - Crystal SC parts- #Kurt #09/02/94

need license for SIR

13 Define key points to test on proto- #Mark #09/06/94
types/eng models..vcc/gnd/clks Jergens
Parker

14 Make sure that same test fixture #Parker #09/15/94
will work on io expander and micro-
dock pwb

15 Begin IR Build (qty 60) Waiting on #sarah #09/15/94
IC

16 Need message to be printed on screen #Tonya #09/15/94
on bootup;

17 Status/schedule of batt. charger? #Vaughn #09/15/94
Review spec asap. Dan
Mark

18 Determine establish need for automo- #Tonya #09/15/94
bile plug adapter

19 Procure video and test eqpt (x2 for #Jennings #09/15/94
EMI also)

20 Need 1st pass service plan #Owen #09/15/94

21 Spec for microdock and Dock station #Watts #09/15/94

22 Finalize equip spec..9786050-0001 #Vaughn #09/15/94

23 BatteryPro and SMI heat management #Watts #09/15/94
code

24 Setup supervid. adpater cable #Mark #09/30/94
options

25 need plan for selection and qual of #Livingst #09/30/94
700+ MB drive jeff
Vaughn
Rawls

-MSG M#= 1623462 FR=ERPG TO=EVWE SENT=09/02/94 11:57 AM
R#=118 ST=C DIV=0014 CC=00584 BY=ERPG AT=09/02/94 11:57 AM

TO: Dennie Shadrick DJS

COPY:				
	Nassir Ahmed	XNAX	Elliott Owen	EGO
	Richard Dolgener	ERDE	Mark Rendon	RNDN
	Phil Everett	TPME	Johnny Robbins	JER
	J.W. Krueger	TJWK	Jerry Rycaj	XJRX
	Bob Livingston	QAET	Dale Sitz	SITZ
	Alan Luecke	AL1	Vaughn Watts	EVWE
	Marcia Logan	MAL3	Margaret Willie	ADMT
	Blake Middleton	AG88	MaryAnn Toperzer	TOPZ
	Robert Moore	SLIC	Curtis Breaux	CURT
	Tom Grimm	ETGE	Steve Wallace	ASJW
	Kevin Davis	KDD		

FROM: Jack Rawls EJRE

SUBJ: WEEKLY REPORT FOR WEEK ENDING 9/2/94

NEW PRODUCT MILESTONES

	ENG MODELS	PRE-PROD.	MASS PROD.	KEY ISSUES
LilyP	9/23/94	10/14/94	10/24/94	PWB Debug, Plastics, BIOS
Lily Microdock	9/16/94	10/13/94	10/27/94	PWB Layout, Plastics
LilyD	10/13/94	TBD	TBD	PWB Layout, Schedule
LilyDock	11/15/94	2/01/95	2/21/95	Plastics/Metal, PWB
PB1C	9/05/94	10/11/94	10/13/94	Qualification
PB3	9/07/94	10/25/94	11/01/94	PWB, Bios Qual Test

ACCOMPLISHMENTS
- Participated in review of JG79 for PPP/CMS.

- Completed inputs for McKinzey study.

Current Products
- Reviewed service process and identified milestones to support new product introductions. Plan to use revised process for new PB and Lily products.

- Reviewed May tickets for PB1 failures-top three were keyboard, display, and HDD. Received CSL database for Paintbrush failures since May (by month, by model).

- Generated memo to use radial lead crystal (Daewoo) for E-series and

EXHIBIT F-1

PB due to shortage of SMT part.

- Generated memo to ship E-series without mouse bags due to shortage. Units were shipped with flyer supplied by marketing.

- Released memo to provide rework for Comal units that fail for "white screen". The rework will be on an as needed basis.

- Generated ECN to upgrade all PB models to latest BIOS (build 10).

- Diagnosed returned docking station from Trammel Crowe. Chief cause of failure was damaged expansion cable.

- Submitted initial FRU list for PB1C.

New Products

- Met with Seagate to review HDD Roadmap. Confirmed that they will not have 700+ MB until 2Q95. Made decision to focus on 810 MB (IBM, Areal) for 4Q94 Lily requirements.

- Reviewed Lilydock sourcing strategy - plan to keep in Temple (vs. Daewoo) with support from CMS. Key issue is resources for PWB (CMS) and Mechanical (CPD).

- Completed LilyP sample for agency tests. Received preliminary UL, CUL, and TUV approval! In addition, the testing yielded valuable data on thermal profiles.

- Evaluated availability of LilyP prototypes - expect to yield 8 (of 12) units for internal checkout, qualification. Offered Intel the opportunity to pick from remaining 4 board sets.

- Received plastics/metals for Lily Microdock prototype build, PWB's due 9/7. Developed alternate approach to float VGA connector.

- Distributed first-pass specification for Lily Slice.

- Continued checkout of Lily main PWB - still working issues with FDD and Laplink. Started layout of Rev. A PWB.

- Made significant progress on Lily PCMCIA PWB checkout. Completed input for REV A.

- Structure released all Daewoo and Temple versions of PB1B/PB1C (8.4 TFT and 9.5 DS), PB3, and display assemblies (8.4 TFT, 9.5 DS, 9.5 TFT) by 8/31 deadline.

- Expedited PB3 JA for prototype boards (qty 9) through SMT. Will complete flow solder on 9/1.

ISSUES

- None

PLANS

- Get commitment for Lilydock resources.

- Receive Lily Microdock PWB's, start assembly - 9/9.

- Hold schedule for Lily PWB vendor packs.

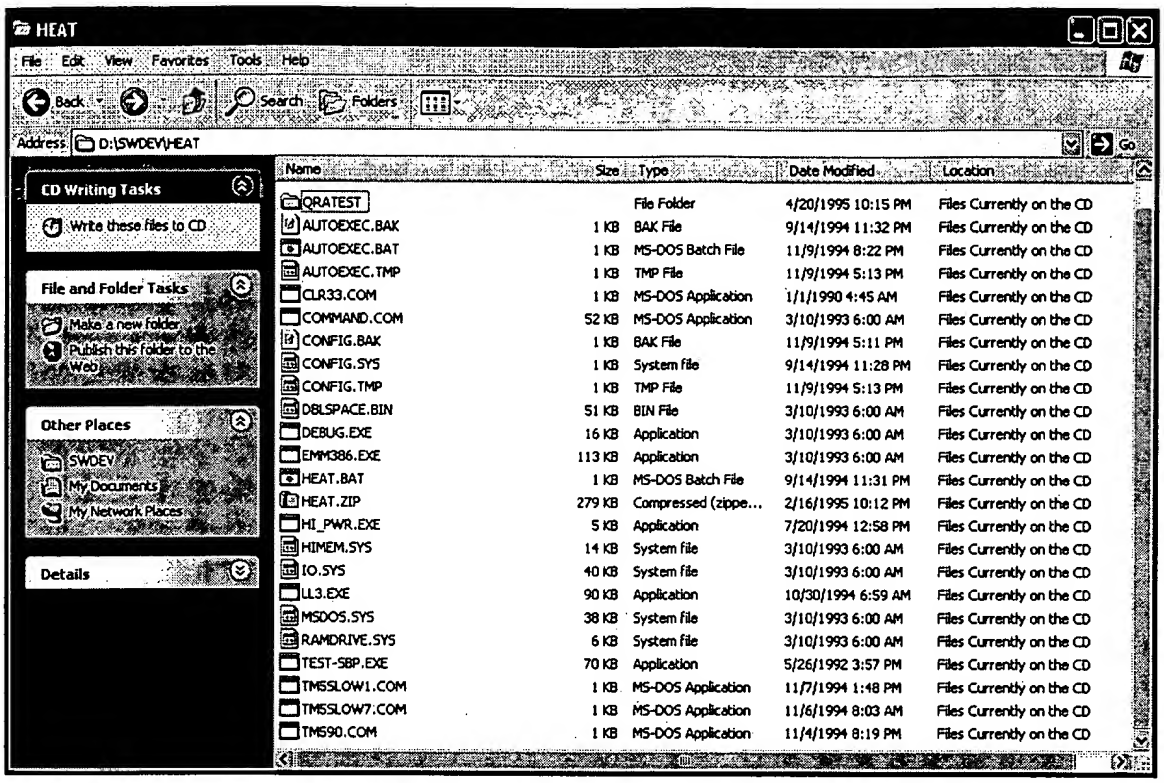
- Complete remaining LilyP prototypes.
- Complete PB1C/PB3 program review - 9/2.
- Attend kickoff meeting with new service provider.
- Debug PB3 prototype boards. Build units.
- Release drawings for PB1B/1C/3.
- Complete LilyD schematic, drafting input.
- Finalize Lily Microdock, Lilydock schedules.
- Complete performance reviews.
- Close issues on PCDR diagnostics and schedule meeting.
- Define LilyD schedule.

VACATION/TRAVEL

- None Planned

Regards,
Jack Rawls

EXHIBIT F-3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File Edit View Favorites Tools Help
Back Search Folders
Address D:\SWDEV\HEAT
Go
CD Writing Tasks
Write these files to CD
File and Folder Tasks
Make a new folder
Publish this folder to the Web
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SWDEV
My Documents
My Network Places
Details
Name Size Type Date Modified Location
QRATEST File Folder 4/20/1995 10:15 PM Files Currently on the CD
AUTOEXEC.BAK 1 KB BAK File 9/14/1994 11:32 PM Files Currently on the CD
AUTOEXEC.BAT 1 KB MS-DOS Batch File 11/9/1994 8:22 PM Files Currently on the CD
AUTOEXEC.TMP 1 KB TMP File 11/9/1994 5:13 PM Files Currently on the CD
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COMMAND.COM 52 KB MS-DOS Application 3/10/1993 6:00 AM Files Currently on the CD
CONFIG.BAK 1 KB BAK File 11/9/1994 5:11 PM Files Currently on the CD
CONFIG.SYS 1 KB System file 9/14/1994 11:28 PM Files Currently on the CD
CONFIG.TMP 1 KB TMP File 11/9/1994 5:13 PM Files Currently on the CD
DBLSPACE.BIN 51 KB BIN File 3/10/1993 6:00 AM Files Currently on the CD
DEBUG.EXE 16 KB Application 3/10/1993 6:00 AM Files Currently on the CD
EMM386.EXE 113 KB Application 3/10/1993 6:00 AM Files Currently on the CD
HEAT.BAT 1 KB MS-DOS Batch File 9/14/1994 11:31 PM Files Currently on the CD
HEAT.ZIP 279 KB Compressed (zippe... 2/16/1995 10:12 PM Files Currently on the CD
HI_PWR.EXE 5 KB Application 7/20/1994 12:58 PM Files Currently on the CD
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IO.SYS 40 KB System file 3/10/1993 6:00 AM Files Currently on the CD
LL3.EXE 90 KB Application 10/30/1994 6:59 AM Files Currently on the CD
MSDOS.SYS 38 KB System file 3/10/1993 6:00 AM Files Currently on the CD
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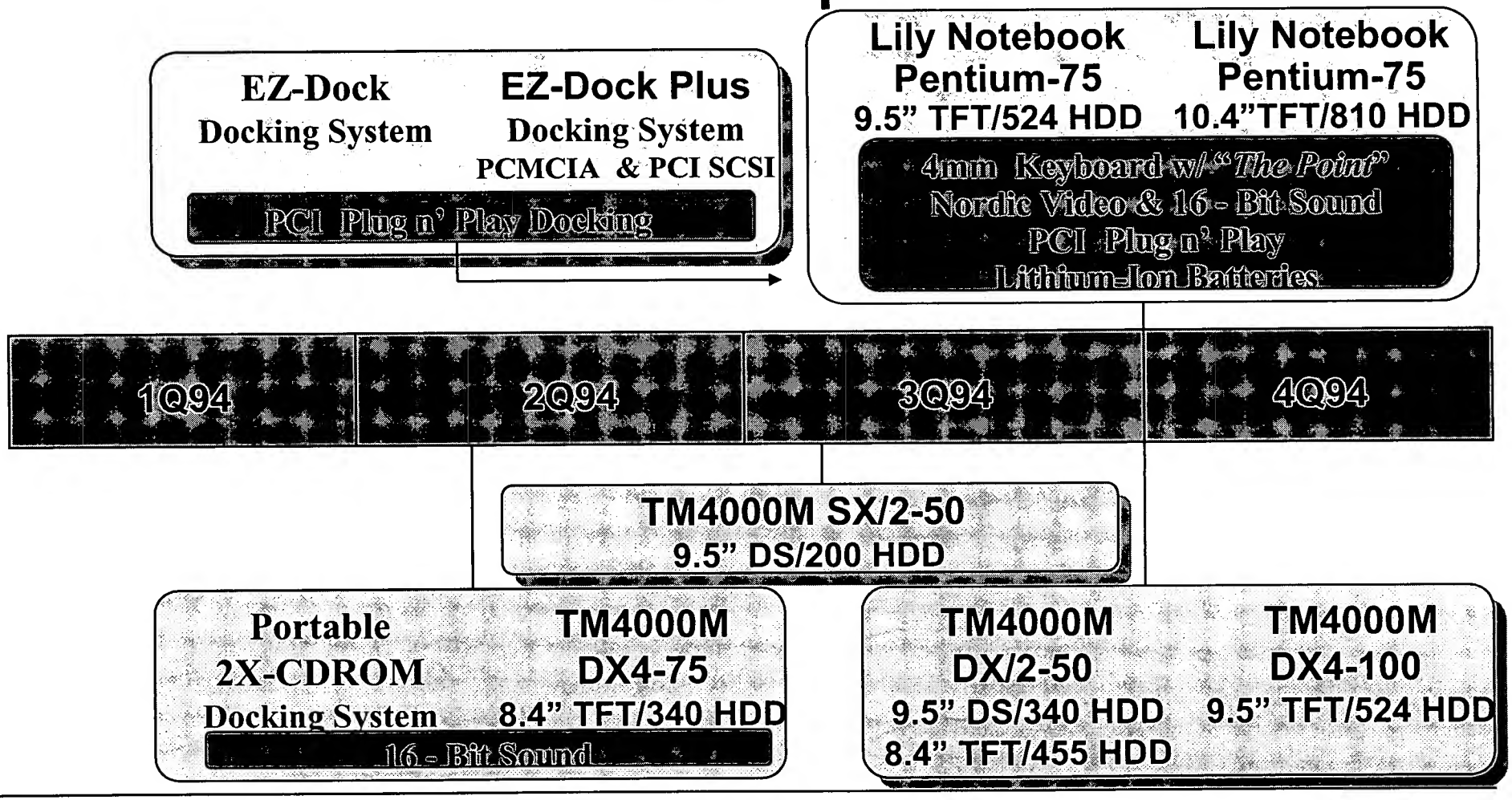
TEST-SBP.EXE 70 KB Application 5/26/1992 3:57 PM Files Currently on the CD
TM5SLOW1.COM 1 KB MS-DOS Application 11/7/1994 1:48 PM Files Currently on the CD
TM5SLOW7.COM 1 KB MS-DOS Application 11/6/1994 8:03 AM Files Currently on the CD
TM590.COM 1 KB MS-DOS Application 11/4/1994 8:19 PM Files Currently on the CD

EXHIBIT G

Notebook Strategic Business Unit Roadmap



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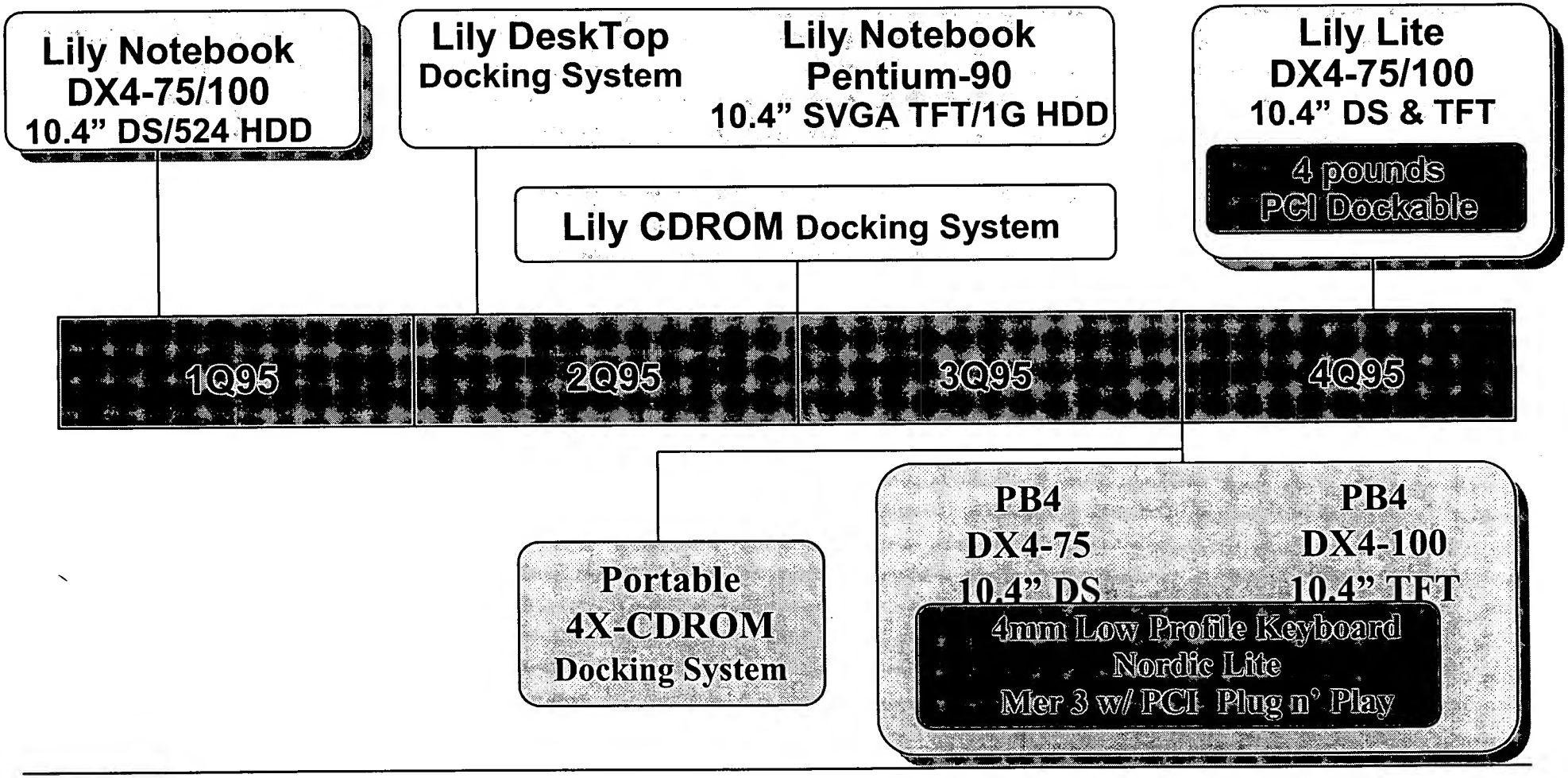
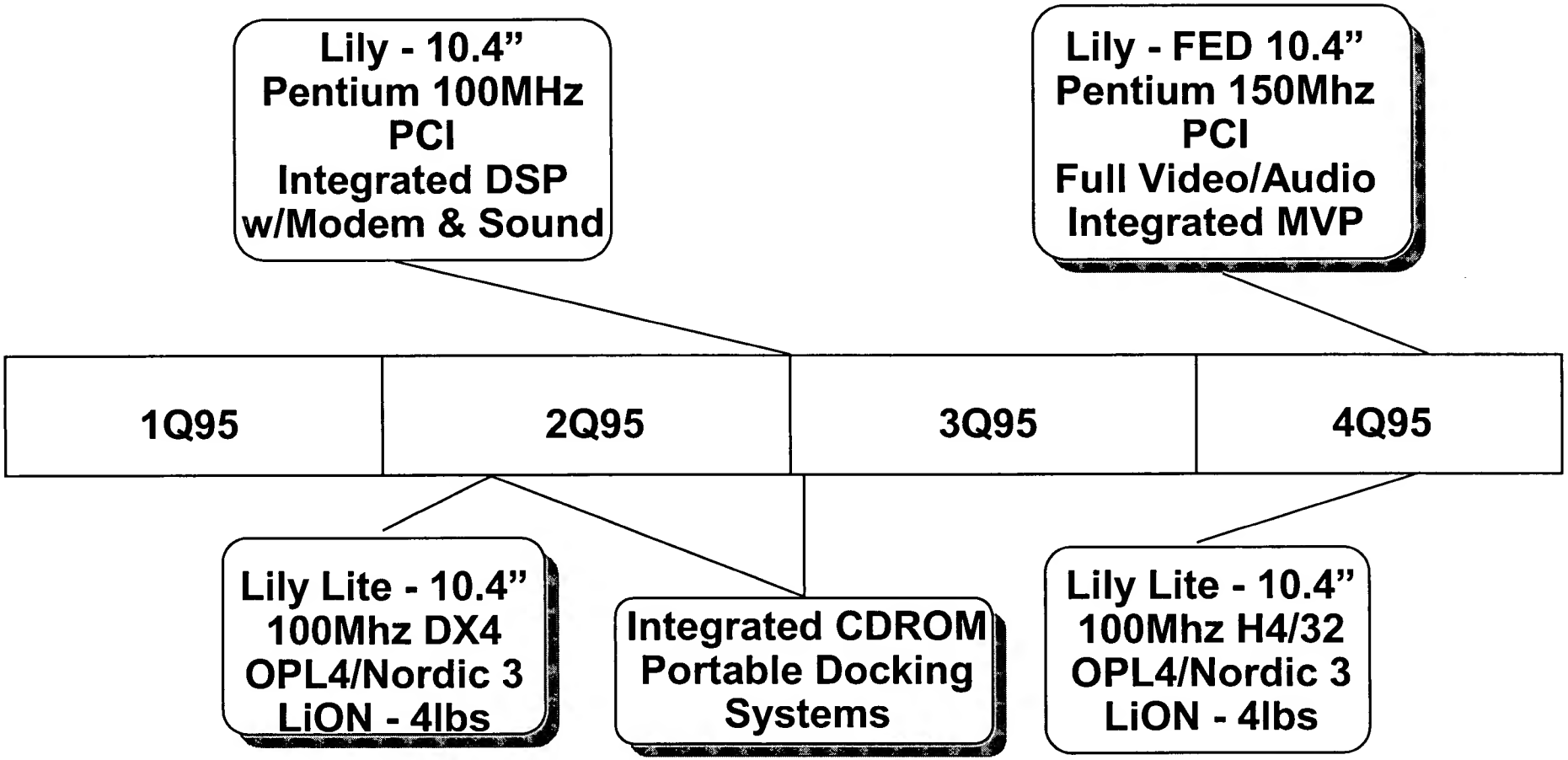
Notebook Strategic Business Unit Roadmap



Notebook Strategic Business Unit Roadmap



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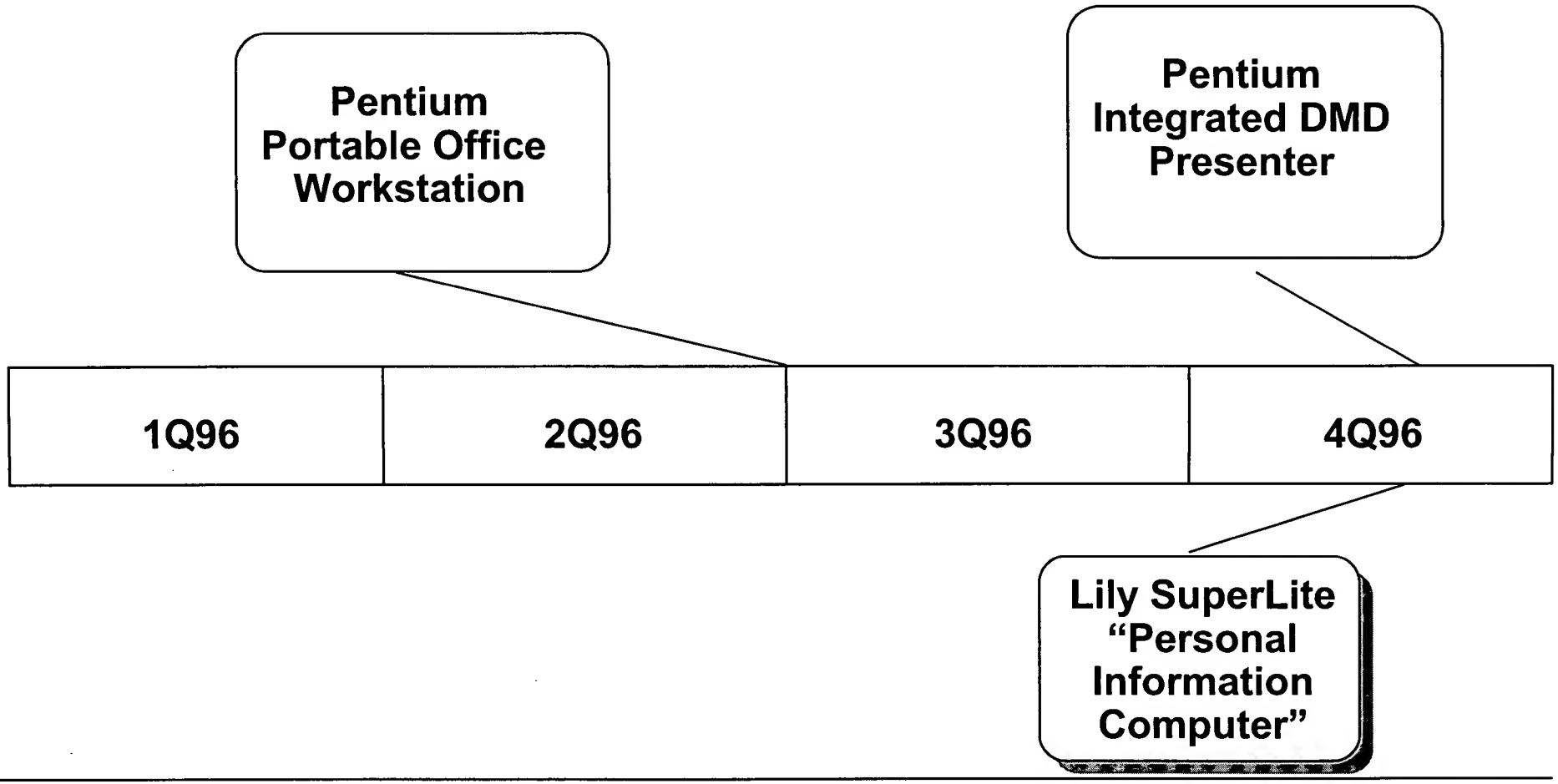

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Notebook Strategic Business Unit Technology Roadmap

IntelDX4-75MHz	IntelSX2-50MHz	IntelDX4-100MHz P54C-75MHz	P54C-90MHz DX2/50 3Volt
MER2 w/StopCLK		MER3 / 50MHz Bus PCI Bus w/SideBand	
2Q94	3Q94	4Q94	1Q95
Cirrus 6440 Sharp 8.4 LP Samsung 9.5	Sanyo 9.5 DS LP	Cirrus Nordic Sharp 9.5 LP	Cirrus Nordic 2 Sharp 10.4 LP
340/455 HDD		524 HDD/VL	750 HDD/VL
16 Bit Sound / OPL3		Wave Sound S/W	OPL4
		VESA Feature	/ S-Video (NSTC) / TV Tuner

Notebook Strategic Business Unit Strategic Issues

- Time to Market with Pentium Notebook
  - Compaq will market "A4" size Pentium Notebooks with FAN - 4Q94
  - Toshiba will market Pentium Notebooks - 4Q94
  - Some annoucements of "A4" with FANs -June/July 94
  - Chip Sets available by 4Q94

- Lily Lite Product Market Requirements
  - Dockable, Plug n' Play, PCMCIA
  - Light with power CPU (~75/100Mhz)
  - Only major player without Subnotebook

- PCMICA / Dockable/ Plug n' Play
  - Current product line lacks PCMCIA
  - Current product line lacks Hot Docking

Notebook Strategic Business Unit Key Technology Approach

- Industry Direction - Faster processors with wider and faster bus architectures built around the Intel SL Enhanced CPU Power Management (SMM) interface continue to force total system design to understand key technical and market attributes:
  - Wider bus moving from 32 bits to 64 bits.
  - Faster bus requirements for VL-Local Bus to new PCI bus.
  - PCMCIA bus will be used for IO functionality independent of CPU bus.
  - Pentium Core and Bus in combination with DX4 Core and Bus will move CPUs to various 32 and 64 bit combinations.
  - CPU technology will be available to the key computer makers at the same time.
  - Differentiation will be available to computer makers *but not at the CPU component level.*

Notebook Strategic Business Unit Key Technology Approach

- **TI Direction - Differentiation must be made at the system level rather than at the CPU or component level. Key successful differentiation will be built around system architectures with the same engine as all other computer makers.**
  - Memory systems
  - Power management and Heat management systems
  - Video and Audio systems
- **Key supplier and co-development of technologies available at or ahead of competition availability.**
  - Displays (Sanyo/Sharp/Samsung/FED-TI)
  - Audio/Sound (Media Vision/US Robotics/TI)
  - Video (Cirrus and PPP [TI] co-development)
  - Memory (Samsung/TI/RAMTRON)
  - Core Logic (PPP[TI]/AT&T/Others(?))
  - Software (Phoenix, Microsoft, Media Vision, Cirrus, US Robotics)
  - Batteries(Energizer), Pointing (IBM), HDDs (Seagate), Keyboards (Brother)

Notebook Strategic Business Unit
Key Technology Approach

- Key Components to Differentiation
  - Core Logic
    - BatteryPro architecture (power management) H/W & S/W & BIOS
    - Video controller interface integration (PPP[TI]/Cirrus)
    - High speed memory systems (EDRAM/SCD)
    - Elimination of interrupt latency (BatteryPro)
    - Plug n' Play, Hot/Warm Docking, Smart & Intelligent Docking
    - Power Management for new devices (Sound/Audio)
  - Display, Power, Video, Audio Systems
    - Access to key subsystems combined with PPP [TI] power management
    - Integration with BatteryPro, Power Systems, and custom control
    - Advanced package capability such as TCP with Heat control

Notebook Strategic Business Unit Technology Trend Summary

- **Software** - Continuous development for multi-tasking/session OS/GUI
  - Consuming more memory, CPU cycles, Video Cycles
  - Requiring more disk storage
  - Scaleable across display resolutions
  - More utilities moving into core OS
  - MS-DOS being replaced by Windows Operating Environment
  - Plug n' Play required in basic OS & BIOS
  - Power Management (APM) standard
- **Processor** - Continuous development of higher performance CPUs
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management Interface (SMM)
  - Faster Bus (ISA - VL - PCI)
  - Co-processor (Math)

Notebook Strategic Business Unit Technology Trend Summary

- **Memory** - Continuous development for higher performance CPUs
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management (5V - 3V)
  - Faster Bus (Synchronous, EDRAM, RAMBUS)
  - Cache Systems (12-15 ns)

- **Proprietary ASICs**- Continuous development for higher performance systems
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management (5V - 3V)
  - Faster Bus (Synchronous, EDRAM, RAMBUS)
  - Cache Systems (12-15 ns)
  - Integration with BatteryPro system architecture
  - SMM vs. Interrupt latency

Notebook Strategic Business Unit Technology Trend Summary

- **Storage** - Continuous development of higher performance HDDs
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management, Lower Power (5V - 3V)
  - Faster Bus (ISA - VL - PCI)
  - Low Profile (19mm - 12 / 10 mm)
  - Lower weight (7 oz. - 5 oz.)
  - Smaller (2.5" - 1.8")
  - New head technology (Thin film - MR)
- **Display** - Continuous development for higher quality displays
  - Faster refresh (300 ms - 250 ms - 100 ms - 50 ms)
  - Power Management (5V - 3V)
  - Lower Power, Brighter Displays
  - STN DS Color, TFT, Active Addressing, FED
  - Movement to larger displays (8.4" - 9.5" - 10.4")
  - Movement to smaller displays (8.2" - 7.8" - 7.5")
  - Better / larger / greater resolutions (VGA - SuperVGA)

Notebook Strategic Business Unit Technology Trend Summary

- **Battery** - Continuous development of higher capacity batteries
  - NiCAD - NIMH - LiON
  - Longer life (recharge cycle time, number of times)
  - Smart batteries (charger and memory imbedded)
  - Low Profile (4/3 A's, 6, 10, or 12 cell packs)
  - Lower weight, higher density, more power
  - Standard package size, off - the - shelf package (Compaq)

- **Power Systems-**
  - Smart battery chargers & integrated memory systems
  - Multi-voltage, auto-sensing
  - Less heat, better integration (smart cords), internal w/o Fan
  - Processor controlled (Power on/off under OS control)
  - Smaller size, faster charge

Notebook Strategic Business Unit Technology Trend Summary

- Video Systems- Continuous development of higher performance video
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management, Lower Power (5V - 3V)
  - Faster Bus (ISA - VL - PCI)
  - Live Video/Audio integration
  - Higher resolution, more colors (4 - 8 - 24 bit color)
  - Graphic Acceleration & Color Expansion
  - Generic Drivers - out-of-the-box support
  - Docking system / PCMCIA interface

Notebook Strategic Business Unit Technology Trend Summary

- Input Devices - Continuous development ease of use interfaces
  - Longer key travel (2mm - 3mm - 4mm)
  - Integrated TrackPoint
  - Lower cost, higher reliability pointing device
  - Lower weight, smaller size (subnotebooks)
  - Handwriting / pen input
  - Wireless

- Communications- Continuous development of higher integration features
  - Wider bus (8 - 16 - 32 - 64)
  - Power Management, Lower Power (5V - 3V)
  - Faster Bus (ISA- ISA/PCMCIA - PCI - PCI/PCMCIA)
  - Type III and Type II PCMCIA form factor
  - Longer distance (12V interface)
  - Higher integration (Modem/FAX/LAN single PCMCIA)
  - Integrated DAA / XJACK / Single Cable

Notebook Strategic Business Unit Technology Trend Summary

- **Packaging** - Continuous development total packing concepts
  - SMT - BGA - TAB(TCP)
  - Heat management
  - EMI shielding
  - Lower weight, better strength material
  - Flexible & Modular packaging (NEC Versa)
  - Higher Integration

Notebook Strategic Business Unit Technology Trend Summary

- Docking Systems-
  - Power Management, Lower Power (5V - 3V), EPA Green
  - Faster Bus (ISA - VL - PCI), Docking Bus
  - Multi-docking (Microdock/ CDROM Portable Dock/ Desktop)
  - Plug n' Play
  - Hot / Warm Docking
  - Higher integration
  - New interfaces (Video Feature connectors, etc)
  - Smart/Intelligent Microprocessor controlled
  - Intelligenent OS integration

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Notebook Strategic Business Units Technology Relative Access Summary

Technology	Compaq	IBM	Toshiba	AST	TI
Processor	+	+	+		+
Memory					
Core Logic			+		+
Storage		+	+		+
Display		+	+	-	
Battery	+	+	+		+
Power Systems			+		+
Video Systems	-		-	-	+
Audio Systems	-	+		-	+
Input Devices		+	+		+
Communications	+	+	+		-
Software	+			-	+
Packaging			+		
Docking System	+		+	-	+

```
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; U.S. Patent No. 5,218,704  --Other U.S. PAT. Pending'
; ORIGINAL CODER: La Vaughn F. Watts, Jr. Texas Instruments
Employee #110926
;
;
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;NewFile=Trange.INC
;Lifted and recoded: Watts (10/14/94)
;Recoded for Flash BatteryPro access 2/25/95
```

EXHIBIT I-1

```
;Alrights reserved
;
;       Do Thermal Management - Needs to be called every one
minute or so!
;
     Public  DoThermalManagement
     extrn   CmosReadMask:near
     extrn   CmosWriteMask:near
     extrn   DozeInitialize:near

DoThermalManagement     proc    near
     pushf                                  ;3-12-95vw
     cli                                    ;3-12-95vw
     push    ax
     push    bx
     mov     al,3ah
     call    CmosRead                       ;Read Temperature byte
     mov     al,ah                          ;Direction/Time/Level
     and     al,38h                         ;Just the time and level
please
     cmp     al,08h                         ;Time to read data from KB?
     je      DoKBThermalRead
     shr     al,3
     dec     al
     and     ah,NOT 38h                     ;Keep theold stuff
     shl     al,3
     or      ah,al                          ;New value
     jmp     WriteDownCountT

DoKBThermalRead:
;
;       Try for a Thermal Management hit: return time count = 0
then
;       we had one, else we need to leave it along.
;
     call    UpdateTemperature              ;Do it
     mov     al,3ah
     call    CmosRead                       ;Read Temperature byte
     mov     al,ah                          ;Direction/Time/Level
     and     ah,38h                         ;Just the time and level
please
     mov     bh,al                          ;Get the direction
     and     al,7                           ;Level computed for Temp
range
     and     bh,11000000b                   ;Direction

     cmp     ah,0                           ;Good read?
     jne     LeaveDownCountT                ;Nop, leave it along
;
;       This is where we do some thermal management
;       Hold ah value or reset it as needed...
;
     cmp     bh,11000000b                   ;OSC?
     jne     NotTR_OSC                      ;Nop!
```

EXHIBIT I-2

```
;
;       OSC, so set the temp level up by one
;
     mov     bh,00000000b            ;Force downward
     cmp     al,7                    ;Already at max?
     je      NotTR_OSC               ;yep, leave alone
     inc     al                      ;Force level temp up by one
NotTR_OSC:
;
;       Time needs to be set based on T Level
;
     mov     ah,7                    ;Max  available
     sub     ah,al                   ;7-7 = 0 so watch it!
     cmp     ah,0
     jne     NotBigZ                 ;Not zero
     inc     ah                      ;Look at every minute
NotBigZ:shl     ah,3                    ;Align the time constant
     or      ah,bh                   ;Align the direction
     or      ah,al                   ;Align the TRange
     mov     bl,al                   ;TRange
     mov     bh,0                    ;Upper index.
;
;       Need to setup the Doze Value based on current TRange
;
     push    ax

IFDEF   zzzlilyp                        ;5.08.1 6-3-95vw Set Doze
value
     mov     ah,byte ptr cs:TDozeTable[bx]
     mov     al,54h                  ; Index register to write
     call    CfgWrite
ENDIF   ;zzzlilyp

IFDEF   zzzlilyd                        ;5.08.1 6-3-95vw Add doze
code here
ENDIF   ;zzzlilyd

     pop     ax                      ; Minutes to next scan
WriteDownCountT:
     mov     al,3ah
     Call    CmosWrite               ; Write it out
LeaveDownCountT:
     pop     bx
     pop     ax
     popf                            ;Restore Interrupts
     ret

TDozeTable:
     db      00h                     ; Disabled
     db      38h                     ; 2 sec's
     db      30h                     ; 1 sec
     db      28h                     ; 1/2 sec
     db      28h,28h,28h,28h,28h     ;4.48b  5-11-95
;        db      20h                     ; 1/4 sec
```

EXHIBIT I-3

```
;
;       Found that Doze within 1/6 to 1/4 second is fastest that
can do
;       with ACC chip set. This error condition is when the fdd
is being
;       written too. Guess that we are sampling inside the DMA
cycle time
;       and the old DMA conflict bus problem bites us here...
5-11-95vw
;
;        db      20h,20h,20h             ;Need to watch out
5-11-95vw

;db      18h                     ; 1/8 sec
;db      10h                     ; 1/16 sec
;db      08h                     ; 1/32 sec
;                                ; End of 5-11-95vw changes in
4.48.2


DoThermalManagement     endp

;
;       Read the Temperature on the system board controlled by
Keyboard Controller
;
;       Calling Arguments
;
;       Call    UpDateTemperature
;       ON exit, the cmos parameter will contain the correct
values
;
;3-30-95vwCHANNEL_RETRY equ      16000
;CHANNEL_RETRY equ      177*3     ; It takes 177 for a good pass
at 75Mhz
;CHANNEL_RETRY equ      463*3     ; It takes 463 for a good pass
at 75Mhz

CHANNEL_RETRY equ       500*3    ;Round upward

;
Public  UpdateTemperature
extrn   CmosRead:near
extrn   CmosWrite:near
extrn   CmosWriteMask:near
UpDateTemperature  Proc    Near
     pushf
     cli                                ;Disable Interrupts
     push    ax                         ;3-18-95vw
     push    bx                         ;3-18-95vw
     push    cx                         ;3-18-95vw

     mov     al,39h                     ;Read Keyboard channel
access flag
```

EXHIBIT I-4

```
        Call    CmosRead
        test    ah,80h                  ;Channel clear?
        jnz     BusyKeyChannel          ;Nop, exit
        mov     ax,08039h               ;Busy Channel
        mov     bl,10000000b            ;Mask to write
        call    CmosWriteMask           ;Bit updated

        mov     cx,CHANNEL_RETRY        ; retries
        in      al,54h
        test    al,1                    ;check the output buffer
status
        jz      testkbc_1               ;output buffer not full?
;
;       If I read something from the keyboard here to clr the
channel
;       it most likely is NOT Mine and someone else will be
unhappy.
;       So. leave the data in the pipe..anyway for now!
;

        jmp     ClearBusyKeyChannel

testkbc_1:                              ;yes, output buffer not
full.
        test    al,2                    ;check input buffer status
        jnz     ClearBusyKeyChannel
;
;       The channel is Mine!
;
;5-4-95vw        STI                                     ;3-29-95vw
;
;       I removed the above STI from the system because
;       we found that the floopy locked up during battery
operation
;       when writing a file from Windows Office (like MSWORD) to
the fdd
;       I don't know why this other than it is another stack
limitation.
;       Best wishs to the guy or gal that picks this code up in
the future.
;       Thanks Scotty, I'm beamed up and home ward.  Vaughn Watts

        mov     al,0c4h                 ;Output the read A/D.
        out     54h,al
testkbc_2:
        loop    testkbc_2_Okay          ;3-30-95vw Don't hang here
        jmp     ClearBusyKeyChannel     ;3-30-95vw?Should we flush
here?
testkbc_2_Okay:                         ;3-30-95vw
        jmp     $+2
        in      al,54h                  ;read status port
        jmp     $+2
        jmp     $+2
        test    al,2                    ;check status of input port
```

EXHIBIT I-5

```
and output port.
     jnz     testkbc_2                  ;full ? , then go back.
;
;       Any kind of delay here will cause the H8 to abort the
command.
;
     mov     al,06                      ;empty, then output the read
A/D 6
     out     50h,al                     ;

     mov     cx,CHANNEL_RETRY           ; retries 3-30-95

testkbc_3:
     loop    testkbc_3_Okay
     jmp     ClearBusyKeyChannel
testkbc_3_Okay:
     jmp     $+2
     in      al,54h                     ;read the status
     test    al,1                       ;check the output buffer
status
     jz      testkbc_3                  ;check if output buffer not
full, then go back
     in      al,50h                     ;full. then, get A/D value

     cmp     al,0ffh                    ;valid value?
     je      ClearBusyKeyChannel        ;Nop!          3-17-95vw
                    ;DEBUG CODE..WAtts 3-12-95vw INACTIVE
     cmp     al,00h
     je      ClearBusyKeyChannel        ;Nop!  3-17-95vw
     push    ax
     mov     ah,55h
     xchg    al,ah
     extrn   CmosWrite:near
;5-3-95vw
;5-3-95vw       Protect against the power switch being turned off
during update
;5-3-95vw
     xchg    bx,ax                      ;5-3-95vw
     pushf                              ;5-3-95vw
     cli                                ;5-3-95vw Disable interrupts
     in      al,0e2h                    ;5-3-95vw Get software
status
     mov     ah,al                      ;5-3-95vw
     or      al,3                       ;5-3-95vw Force to software
override
     out     0e2h,al                    ;5-3-95vw
     xchg    ax,bx                      ;5-3-95vw Read to write data

     call    CmosWrite
     extrn   Extcmoscsum:near
     call    ExtCmosCsum
     xchg    ax,bx                      ;5-3-95vw
     xchg    ah,al                      ;5-3-95vw
     out     0e2h,al                    ;5-3-95vw Put switch back to
```

EXHIBIT I-6

```
way it was
     popf                                ;5-3-95vw Restore interrupts
to way it was
;5-3-95vw
;5-3-95vw End of modifications to protect power switch
;5-3-95vw
     pop     ax
                    ;DEBUG CODE..WAtts 3-12-95vw
;
;       Constant  00 - 255 value : 0 -- 5000mV
;       Constant  10mV/1 degree C
;       k = (5000/255)    = 19.607843
;       n degree C = k/10
;       n degree C = k/10 * Value
;
;       Smart range coded added 3-12-95vw
;       Allow user to select which range of thermal management he
wants
;       Power Saving = ON --DC range
;                       OFF -AC range
;                      AUTO -If AC operation, using AC range
;                           -If DC operation, using DC range
;
     xchg    al,cl                       ;cl now has temperature read

     mov     al,66h                      ;Location of Power Savings
Selection
     mov     bl,11000000b
     call    CmosReadMask                ;Get timer information
     cmp     ah,1                        ;On Selection?
     je      DCSetRange                  ;Force DC Thermal Range
     cmp     ah,0                        ;Off Selections
     je      ACSetRange                  ;Force AC Thermal Range
;
;       3-24-95 Added Auto/On?off selection
;
     mov     al,66h
     call    CmosRead                    ;Get Auto/On/Off Selection
     shr     ah,6
     cmp     ah,0
     je      ACSetRange                  ;Do AC all the time
     cmp     ah,1                        ;ON?
     je      DCSetRange                  ;Yes
     in      al,0e3h                     ;Port containing AC
information
     test    al,00001000b                ;Value for AC (Bit on = ac)
     je      DCSetRange                  ;Use DC Thermal range
ACSetRange:                              ;Force to AC Range for
Thermal data
     mov     ah,8                        ;Use ACRangeScanData
     jmp     short SetTrange             ;Do all
DCSetRange:                                 ;Force to DC Range for
Thermal data
     mov     ah,0
```

EXHIBIT I-7

```
SetTrange:
     xchg    al,cl                          ;Al has temp back; ah=index
     mov     cx,7                           ;cx = loop count

ScanRange:
     mov     bx,cx
     add     bl,ah                          ;Over index for ac or dc
     cmp     al,byte ptr cs:[TempRange+bx]
     jg      FoundRange                     ;cx=range number found
     loop    ScanRange
FoundRange:                                    ;cx=range number found

     mov     al,39h                         ;Read Keyboard channel
access flag
     Call    CmosRead
     mov     al,ah
     and     al,3                           ;Last Temperature range
     and     ah,0c0h                        ;Upper direction trend value
     cmp     cl,al                          ;Value of cmos read
     je      RangeStable                    ;Stable process, same range
     jg      RangeUpward                    ;New range is greater than
old one
;                                              ;Range is downward trend
     cmp     ah,10000000b                   ;Lastone upward?
     je      RangeOSC                       ;Yes, found osc
     mov     ch,01h
     jmp     short   AllRange
RangeOSC:
     mov     ch,0c0h                        ;OSC flag
     jmp     short   AllRange
RangeStable:
     mov     ch,00h
     jmp     short   AllRange
RangeUpward:
     cmp     ah,01000000b                   ;Last one Downward?
     je      RangeOSC                       ;Yes. Osc found
     mov     ch,10
AllRange:
     or      ch,cl                          ;Range and range temp trend
     mov     ah,cl
     mov     al,3ah                         ;Note that I clr inter 3
bits for status complete
     Call    CmosWrite

ClearBusyKeyChannel:
     mov     ax,00039h                      ;Free Channel
     mov     bl,10000000b                   ;Mask to write
     call    CmosWriteMask                  ;Bit updated
BusyKeyChannel:
     pop     cx                             ;3-18-95vw
     pop     bx                             ;3-18-95vw
     pop     ax                             ;3-18-95vw

     popf                                   ;Restore status and
```

EXHIBIT I-8

```
interrupts if enabled before
     ret

;       Constant  00 - 255 value : 0 -- 5000mV
;       Constant  10mV/1 degree C
;       k = (5000/255)    = 19.607843
;       n degree C = k/10
;       n degree C = k/10 * Value
;
;       Value   D       K       C       F
;       08h     08      156.86  15.68   60.22
;       0ah     10      196.07  19.6    67.28
;       0ch     12      235.29  23.52   74.33
;       0eh     14      274.5   27.45   81.57
;       10h     16      313.7   31.37   88.46
;       11h     17      333.33  33.33   91.99
;       12h     18      352.94  35.29   95.53
;       13h     19      372.54  37.25   99.05   ;Toshiba Case 37Cc
=98.6F
;       14h     20      392     39.2    102.56
;       16h     22      431.37  43.14   109.65
;       18h     24      470.58  47.05   116.69
;       1ah     26      509.8   50.98   123.76
;       1ch     28      549.01  54.9    130.82
;       1eh     30      588.2   58.8    137.84
;       21h     33      647.05  64.7    148.46
;       22h     34      666.66  66.66   151.98
;       23h     35      686.27  68.62   155.51
;       25h     37      725.49  72.54   162.57
;       30h     48      941     94.1    201.38  ;CPU Max 95C Case
;                                               ;NEC Case Max 50C
;
TempRange       label   byte
DCTempRange     label   byte
          db      0ch             ;Level 0
          db      0eh             ;Level 1
          db      10h             ;Level 2
          db      12h             ;Level 3
          db      14h             ;Level 4
          db      16h             ;Level 5
          db      18h             ;Level 6
          db      1ah             ;Level 7

ACTempRange     label   byte
          db      19h             ;Level 0
          db      1bh             ;Level 1
          db      1dh             ;Level 2
          db      1fh             ;Level 3
          db      21h             ;Level 4
          db      23h             ;Level 5
          db      25h             ;Level 6
          db      27h             ;Level 7

UpDateTemperature   endp
```

EXHIBIT I-9

-MSG M#= 1675414 FR=ESBE TO=EVWE SENT=11/02/94 09:00 AM
R#=628 ST=C DIV=0014 CC=00584 BY=ESBE AT=11/02/94 09:00 AM

To: Vaughn Watts EVWE
Steve Wallace ASJW

From: Sandeep Bhadsavle ESBE

Subject: Travelling & Misc

Hi Vaughn,

IR
==========
1. It does not look like Rob Shram is much interested in working with us to get Laplink IR working. I had a discussion with him Monday & he was going to check with his engineering manager & get back to us one last time ! These are the reasons he cited:
- Lack of resources to get things working for Comdex
- He does not see "Laplink IR" as a BIG market for some time to come.
- He does not want to compete against "Smaller" companies such as Puma for the cost. I think, he was not comfortable with Price target you gave him

I have reinforced your views & TI's relationship with Traveling to package a product with the existing one & importance of the fact that, we believe Traveling can implement this without considerable amount of effort ! I also emphasized that, even if we can not demo something at Comdex, we will still be interested in working with Travailing to get something working ASAP.

But as far as Comdex is concerned, I think they are out.

2. I get calls from Steve Nichol of Puma once in a while. I am not sure if we should work with them at this time.

3. We had a meeting with Crystal yesterday: Wayne Alfarez, marketing, shared his views
- they have (or will have) Windows 3.1 & Windows for workgroups driver by Comdex, which they can let us have it at no cost for shipping to our customers.
- They can also let us use this for demo at Comdex, if we want.
- They are working with Travelling & Puma. They think they can get a solution from Traveling (?) much faster than Puma.

Seems like, Crystal's windows driver is our best bet for Comdex demo where we can demo simple file/data exchange between notebooks.

Batteries
==========
4. 2nd IO channel 54h (cmd/sts just like 64h) & 50h (data just like 60h) is now functional. I tested it with my C test program & it works. Had to use polled mode (in H8) instead of interrupt because of Phoenix's polled architecture. For your testing, you will need a new keyscan code.
All comdex units will have this upgrade.

Earlier COM (64/60) channel is now broken for "gas gauge". C3 command will still work thorugh 64/60 as before. Really C3, command only reads EXTPWR, VIN, & trackpoint switches.

Regards
Sandeep

EXHIBIT J

-MSG M#= 1704703 FR=ESBE TO=EVWE SENT=11/03/94 11:24 AM
R#=707 ST=C DIV=0014 CC=00584 BY=ESBE AT=11/03/94 11:24 AM

To: EVWE

From: Sandeep Bhadsavle ESBE

Subject: RE: MSG From Vaughn Watts

Hi Vaughn,

Please try it as below & let me know if there is a problem.

1. Write C4h to 64h
2. Write data (which A/D channel you want to read ?) to 60h
3. Read data 60h for response

Please note some digital signals are also read as Analog voltages !

A/D channels
0 - EXTPWR

1 - VIN-5V (VIN = [(84.5 + 47) / 47] * VIN_5V in V
0 => 0V
255 => 5V

2 - X stick

3 - Y stick

4 - Right_Switch

5 - Left_Switch

6 - CPU_TEMP <----------
0 => 0mV
255 => 5000 mV
temp in degrees C = CPU_TEMP in mV / 10 mV

7 - EXUNIT-

Regards
Sandeep
==========

>From: EVWE%mimi
>To: sbhadsavle
>Subject: MSG From Vaughn Watts
>Date: Thursday, November 03, 1994 7:39AM

>-MSG M#= 1695271 FR=EVWE TO=ESBE SENT=11/03/94 07:39 AM
> R#=597 ST=C DIV=0014 CC=00584 BY=EVWE AT=11/03/94 07:39 AM

> To: Sandeep Bhadsavle esbe

>Copy: Kevin D. Davis KDD

>From: Vaughn Watts evwe

>I have tried to read the cpu temp (second ad channel) using the c4h

>command. No luck. Can you tell me how to read this information from your
>keyboard controller?

>Vaughn

EXHIBIT K-2

Revision 6 of H8 Kesycan controller code.
Released 11/8/94.

Features:
1. LILY_VERSION = 6 (My current board)
2. Battery type fixed for SONY.
3. H8 will now scan one or both batteries. It does not get latched on
   one battery as before.
4. Battery "Hot plug" feature added. H8 will sniff battery bays every 10
s
   or so to see if a battery in the bay has been removed/added. "Hot
plug" is
   really a "warm plug" beacause H8 can take as much as 20 seconds worst
   case to sense the state of the bay.
5. "Get Cycle #" Sony gauge command added
6. Brother keyboard scanning routine modified to fix a problem noticed
on
   some "bad" (sensitive) KBAMPs. A delay of 26 us added between MUX
select &
   FFOPEN. This should allow plenty of time for the KBAMP to settle if
it
   gets triggered due to MUX switching & "dip" at its KBAMPIN. This
increases
   the keyboard processing time from 1.8 ms to 2.1 ms or so. This should
not
   cause any appreciable difference on servicing of other peripherals.
7. Debounce values (15 ms on break & 20 ms on break) are now definable
in
   the option file TI.OPT
8. Code cleared a bit to create breathing room. 70 bytes until 16K !!!!
9. This code is used in the initial build of 68 boards for Rev B
10. This code is named: (on chip)
   111194
   2026
   #6
==========

Revision 5 of H8 Kesycan controller code.
Released 11/8/94.

Features:
1. LILY_VERSION = 5
2. Battery type fixed for SONY.
   Still both batteries are requred for communication.
3. Read A/D support on 54/50 added
4. This code is named: (on chip)
   110894
   1452
   #5
==========

Revision 4 of H8 Kesycan controller code.
Released 11/2/94 for COMDEX units.

Features:
1. LILY_VERSION = 4
2. Battery type fixed for SONY.
   Still both batteries are requred for communication.
3. Code upgraded from V1.19 to V1.22 per Phoenix
4. GAS gauge COM is now 54/50. 64/60 link is broken. Gas.exe is updated
5. Uses latest TRACKII during linking

6. This code is named: (on chip)
   110294
   0847
   SONY

==========

Revision 3 of H8 Kesycan controller code.
Released 10/24/94 for initial system building.

Features:
1. Battery type fixed for SONY.
   Still both batteries are requred for communication.
2. This code is named: (on the chip)
   102294
   1154
   TP1.33

==========

Revision 2 of H8 Kesycan controller code.
Released 10/22/94 for initial system building.

Features:
1. Fixed "Jerky Mouse in Windows" problem.
   Also, fixed related issues such as slow sensing of mouse double clikcs,
   slow auto repeat etc etc.
2. TRACKPOINT code latest version 1.33 (?) used.
   This fixes the sign reversal & all other known (?) bugs
3. Code is based on Phoenix's original V1.19. All mods are not included.
   Only the mod that requires "additional variable space for new Trackpoint"
   is implemented. This caused the "Jerky Mouse Problem" !
   Other mods will be implemented in the later versions.
4. This code is named: (on the chip)
   102294
   1154
   TP1.33

Sandeep
10/23/94

==========

Revision 1 of H8 Kesycan controller code.
Released 10/13/94 for initial system building.

Features:
1. Fixed for Energizer/SPAN Gas Gauge
2. TRACKPOINT code is the one originally received with Source code.
   It has errors such as sign reversal etc.
3. Code is based on Phoenix's original V1.19. Mods are not included.

Sandeep
10/18/94

Microsoft Excel - LV111194.XLS [Read-Only]

File Edit View Insert Format Tools Data Window Help Adobe PDF

(WHOLE DOLLARS - RECEIPTS REQUIRED FOR ITEMS U.S. $25 OR GREATER) DIR

NAME	EMPLOYEE #	PHONE #	DIV	CC	EXPLAIN MISCELLANEOUS
Vaughn Watts	110926	817 774-6135	14	584	

PURPOSE OF TRIP OR EXPENDITURE	AMEX CORP. CARDHOLDER YES NO	DIV & CC TO BE CHRGD IF DIFFERENT DIV	CC
COMDEX - Visit with Suppliers and Customers Password is blank. Rate used in Calculating Mileage = $ .290	x		

DATE 1994	LOCATION	AIR-FARE	HOTEL	TRAVEL MEALS	PHONE	LNDRY TIPS	CAR RENTAL	AUTO MILEAGE	PARK TAXI OTHER	MISC. NON-TRVL EXPLAIN	ENTERTAINMENT COURTESY
Nov-11	Temple	930	130	B 5	5	L		# 155	P		MEAL
1994	- DFW		13	L 12					T 18		ALCOHOL
Fri	- Las Vega			D 23		T 5		$ 45	O		OTHER
Nov-12			130	B 11		L		#	P		MEAL
1994	-		13	L 14					T		ALCOHOL
Sat	- Las Vegas			D 22		T		$	O		OTHER
Nov-13			200	B 11	2	L		#	P		MEAL
1994	-		16	L 10					T 20		ALCOHOL
Sun	- Las Vegas			D 28		T 8		$	O		OTHER
Nov-14			200	B	9	L 17		#	P		MEAL
1994	-		16	L 8					T 10		ALCOHOL
Mon	- Las Vegas			D		T 2		$	O		OTHER
Nov-15			200	B 12	2	L		#	P		MEAL
1994	-		16	L 15					T 25		ALCOHOL
Tue	- Las Vegas			D		T 3		$	O		OTHER
Nov-16			200	B 12	2	L		#	P		MEAL
1994	-		16	L					T 35		ALCOHOL
Wed	- Las Vegas			D 23		T 4		$	O		OTHER
Nov-17	Las Vegas			B 12	1	L		# 155	P 74		MEAL
1994	- DFW			L 9					T 15		ALCOHOL
Thu	- Temple			D		T 6		$ 45	O		OTHER
	TOTAL $	930	1150	227	21	45		90	197		

DIV.	CC	ACCOUNT NO. MAJOR	ACCOUNT NO. MINOR	WORK ORDER NO.	AMOUNT	DIV.	CC	ACCOUNT NO. MAJOR	ACCOUNT NO. MINOR	WORK ORDER NO.	AMT.

Min. Amt To Pay
AMEX:
Airfare +
Hotel +
Car Rent
If Less, Explain

AD
LES
LES
LES

LV111194

Ready

EXHIBIT M

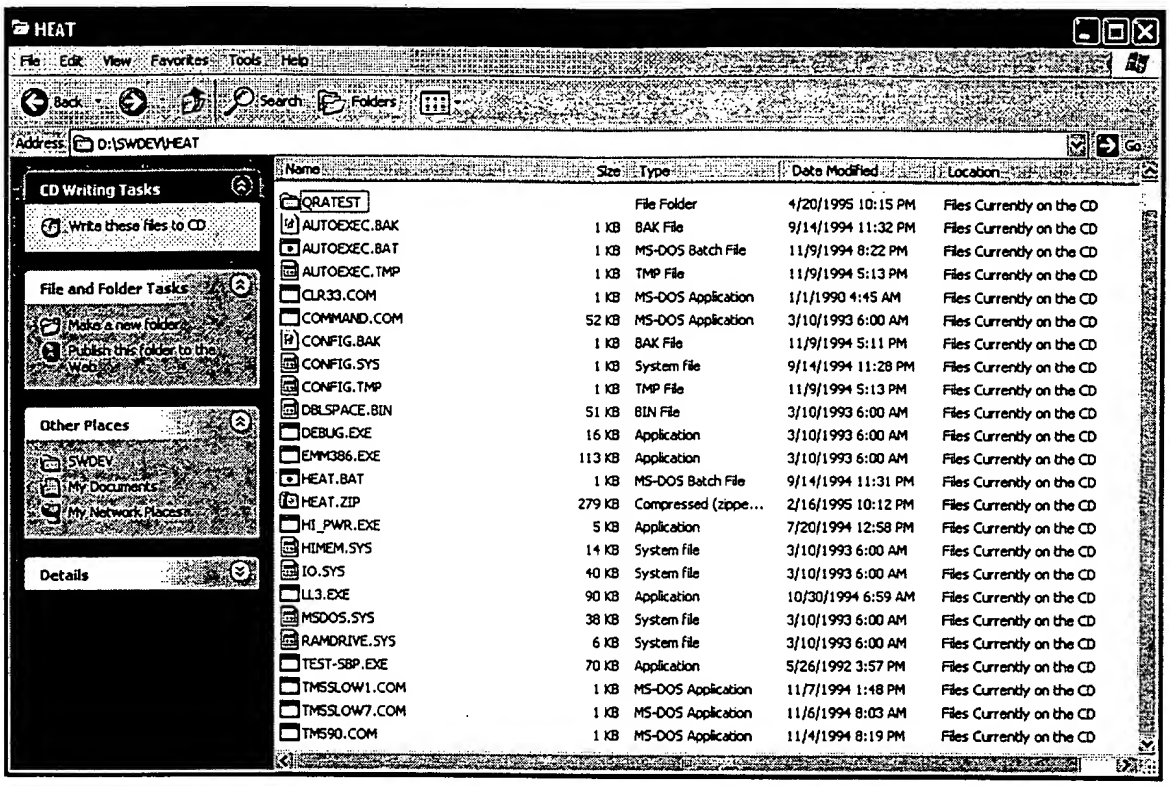
HEAT
File Edit View Favorites Tools Help
Back Search Folders
Address D:\SWDEV\HEAT
CD Writing Tasks
Write these files to CD
File and Folder Tasks
Make a new folder
Publish this folder to the Web
Other Places
SWDEV
My Documents
My Network Places
Details
Name Size Type Date Modified Location
QRATEST File Folder 4/20/1995 10:15 PM Files Currently on the CD
AUTOEXEC.BAK 1 KB BAK File 9/14/1994 11:32 PM Files Currently on the CD
AUTOEXEC.BAT 1 KB MS-DOS Batch File 11/9/1994 8:22 PM Files Currently on the CD
AUTOEXEC.TMP 1 KB TMP File 11/9/1994 5:13 PM Files Currently on the CD
CLR33.COM 1 KB MS-DOS Application 1/1/1990 4:45 AM Files Currently on the CD
COMMAND.COM 52 KB MS-DOS Application 3/10/1993 6:00 AM Files Currently on the CD
CONFIG.BAK 1 KB BAK File 11/9/1994 5:11 PM Files Currently on the CD
CONFIG.SYS 1 KB System file 9/14/1994 11:28 PM Files Currently on the CD
CONFIG.TMP 1 KB TMP File 11/9/1994 5:13 PM Files Currently on the CD
DBLSPACE.BIN 51 KB BIN File 3/10/1993 6:00 AM Files Currently on the CD
DEBUG.EXE 16 KB Application 3/10/1993 6:00 AM Files Currently on the CD
EMM386.EXE 113 KB Application 3/10/1993 6:00 AM Files Currently on the CD
HEAT.BAT 1 KB MS-DOS Batch File 9/14/1994 11:31 PM Files Currently on the CD
HEAT.ZIP 279 KB Compressed (zippe... 2/16/1995 10:12 PM Files Currently on the CD
HI_PWR.EXE 5 KB Application 7/20/1994 12:58 PM Files Currently on the CD
HIMEM.SYS 14 KB System file 3/10/1993 6:00 AM Files Currently on the CD
IO.SYS 40 KB System file 3/10/1993 6:00 AM Files Currently on the CD
LL3.EXE 90 KB Application 10/30/1994 6:59 AM Files Currently on the CD
MSDOS.SYS 38 KB System file 3/10/1993 6:00 AM Files Currently on the CD
RAMDRIVE.SYS 6 KB System file 3/10/1993 6:00 AM Files Currently on the CD
TEST-SBP.EXE 70 KB Application 5/26/1992 3:57 PM Files Currently on the CD
TMSSLOW1.COM 1 KB MS-DOS Application 11/7/1994 1:48 PM Files Currently on the CD
TMSSLOW7.COM 1 KB MS-DOS Application 11/6/1994 8:03 AM Files Currently on the CD
TMS90.COM 1 KB MS-DOS Application 11/4/1994 8:19 PM Files Currently on the CD

EXHIBIT N

Lily Keyscan Board Specification

Revision 2.4
November 16, 1994

Table of Contents

EXHIBIT O-1

SECTION 2 HARDWARE DESCRIPTION

2.1 Lily Keyscan board schematic

Please refer to the Lily Keyscan Board Schematic attached after section 2.2.

2.2 Functional description of the pins of the H8 Microcontroller

Table 2.1 Pin Description

Pin	H8 Name	Mnemonic	I/O	Default St	Function
65	HDB0	XD0	I/O	Hi-Z	Host Data Bus
66	HDB1	XD1	I/O	Hi-Z	Host Data Bus
67	HDB2	XD2	I/O	Hi-Z	Host Data Bus
68	HDB3	XD3	I/O	Hi-Z	Host Data Bus
69	HDB4	XD4	I/O	Hi-Z	Host Data Bus
70	HDB5	XD5	I/O	Hi-Z	Host Data Bus
71	HDB6	XD6	I/O	Hi-Z	Host Data Bus
72	HDB7	XD7	I/O	Hi-Z	Host Data Bus
77	IOR-	IOR-	I	Hi	Host read
78	IOW-	IOW-	I	Hi	Host write
76	CS1-	8042CS-	I	Hi	Host chip select
79	CS2-	-	I	Hi	
74	HA0	SA02	I	-	Host Address
1	RES-	RESET-	I	Hi	System reset
44	IRQ12	IRQ12	O	Hi	Mouse IRQ
43	IRQ1	IRQ01	O	Hi	Keyboard IRQ
42	IRQ11	-	-	-	
75	GA20	-	-	-	
29	AVCC	Analog +5V	I	+5V	VCC
30	P70/AN0	EXTPWR	I	Lo	EXTPWR signal
31	P71/AN1	VIN	I	-	AC/DC, Batterry VIN
32	P72/AN2	X_STICKO	I	-	Trackpoint X
33	P73/AN3	Y_STICKO	I	-	Trackpoint Y
34	P74/AN4	TKPTRGHT	I	HI	TKPT RIGHT SWITCH
35	P75/AN5	TKPTLEFT	I	HI	TKPT LEFT SWITCH
36	P76/AN6	CPU_TEMP	I	-	CPU Temperature A/D
37	P77/AN7	EXUNIT-	I	HI	DOCK STATION CONNECTED
38	AVSS	AGND	I	GND	ANALOG GND
2	XTAL	CRYSTAL	I	-	EXTERNAL CRYSTAL
3	EXTAL	CRYSTAL	I	-	EXTERNAL CRYSTAL
16	P94	-	-	-	
5	MD0	MODE	I	-	MODE SELECT
4	MD1	MODE	I	-	MODE SELECT
7	STDBY-	-	I	-	External EPROM A/D
6	NMI-	WAKE_H8-	I	Hi	Wake up from Hd Stdby
8	VCC	VCC	I	-	VCC
47	VCC	VCC	I	LO	VCC
64	P10	DRV0	O	LO	Scan Drive
63	P11	DRV1	O	LO	Scan Drive
62	P12	DRV2	O	LO	Scan Drive
61	P13	DRV3	O	LO	Scan Drive
60	P14	DRV4	O	LO	Scan Drive
59	P15	DRV5	O	LO	Scan Drive
58	P16	DRV6	O	LO	Scan Drive
57	P17	DRV7	O	LO	Scan Drive
55	P20	DRV8	O	LO	Scan Drive
54	P21	DRV9	O	LO	Scan Drive

EXHIBIT O-2

This command is followed by a data byte as described in Figures 5.3 & 5.4.

This command allows following two function:

- allows the host to configure the requested gas gauge (b7 = 0)
  - To set battery A or B for reporting
  - Configure battery parameters to be read by A3 command
- allows the host to send specific gas gauge command (b7 = 1) by using Gas Gauge Command byte

Please refer Gas Gauge manual for details about battery parameters.

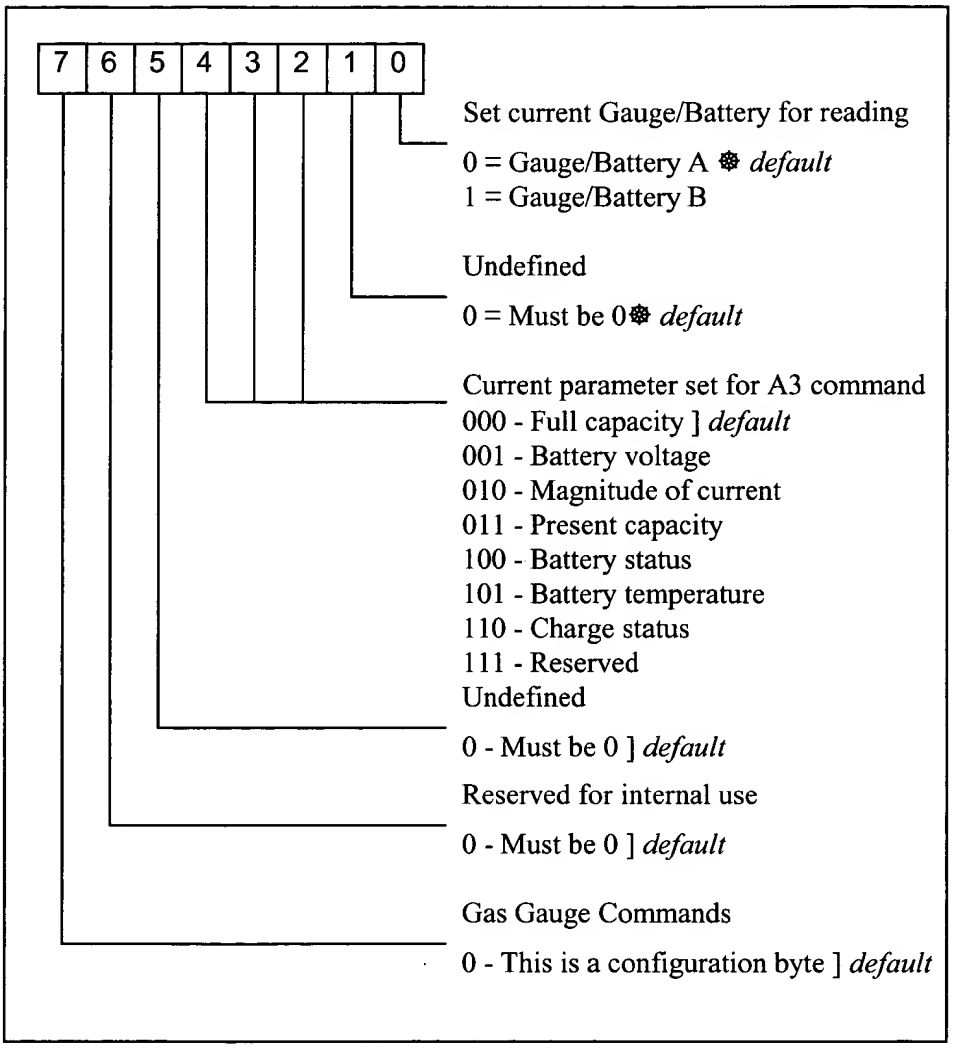

Figure 5.3 Gas Gauge Configuration Byte

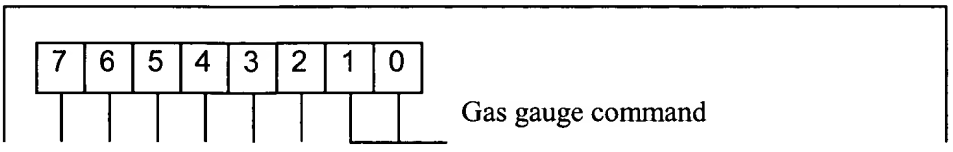

EXHIBIT O–3

Table 5.2 Parameters Reported by NiMH batteries with SPAN gas gauge

Parameter	Formula	Range	Units
Present state of charge	byte1	0 to 100	%
Battery voltage	byte1 + 256 * byte2	-	mV
Magnitude of current	byte1 + 256 * byte2	-	mA
Battery capacity	byte1 + 256*byte2	-	mAHr
Battery errors	byte1	-	Refer doc.
Battery temperature	byte1/256 + byte2	-	degrees C
Battery flag	byte 1	-	Refer doc.

Table 5.3 Parameters Reported by LiION

Parameter	Formula	Range	Units
Full capacity	byte1 * 0.25	00 - EFh	Wh
Battery voltage	byte1 + 256 * byte2	00 - FFh	mV
Magnitude of current	byte1 + 256 * byte2	00 - FFh	mA
Remaining battery capacity	byte1 + 256*byte2	00 - FFh	mWh
Battery status	byte 1	00 - 80h	See below
Battery temperature	byte1/256 + byte2		degrees C
Battery charge status	byte 2	00 - 04h	See below

Battery status:

00 - Good battery 01 - Low battery 0 02 - Low battery 1 04 - Low battery 2
08 - Low battery 3 10 - Temperature flag 40 - End of life 80 - Battery failure

Charge status:

01 - Charging current = or > 150 mA
02 - Trickle charging (when capacity is 87.5% of full capacity)
04 - Discharging (current = or > 150 mA)

5.3.3.4 Examples of communications

Please note the following regarding the communication with alternate I/O chanel - 54h/50h

1. A status read at I/O address 54 yields a status byte of the alternate IO channel.
   bit 0 = if 1, indiactes H8 has sent data to host, it will be cleared when host reads from 50h.
   bit 1 = if 1, indiactes host has sent data to H8, it will be cleared when H8 reads it.
2. Host should not send data/command when bit 1 = 1 & host should not attempt to read when bit0 = 0
3. **Communication & sequence of events is very important !**
4. A1 command is not necessary **(NOT RECOMMENDED !)** every time one wishes to read a parameter. It is ONLY required to read a different parameter every time from a different battery.

5. *All the following examples are well illustrated by the "working test program GAS.C"*

Example 1: (one byte command, one byte response) Read the default parameter (full capacity) from the default gauge (A):
- host sends A3 to 54h, if allowed (i.e. b1 of status read @54h = 0)
- host may wish to see if keyscan controller "digested" the previous "write". Host does this by monitoring b1 of status read @54 go from 1 to 0.
- default parameter is full capacity of battery A
- host waits for b0 of status read @54h to go from 0 to 1
- host reads 1 response byte from 50h
A value of 57h ===> 87 * 0.25 = 21.75 Wh

Example 2: (two byte command, one byte response) Read battery status of battery B
- host sends A1 to 54h, if allowed
- host sends 00010001b to 50h, if allowed
- host waits for b0 of status read @54h to go from 0 to 1
- host reads 1 response byte from 50h
A value of 10h ===> temperature of battery is too high !

Example 3: (two byte command, two byte response) Read Remaining battery capacity from battery A:
- host sends A1 to 54h, if allowed
- host sends 0000110b to 50h, if allowed
- host waits for b0 of status read @54h to go from 0 to 1
- host reads 1 response byte from 50h = byte 1
- host waits again for b0 of status read @54h to go from 0 to 1
- host reads 1 response byte from 50h = byte 2
A value of byte 1 = 9Eh, byte 2 = 5Bh ===> 158 + 256 * 91 = 23454 mWHr

Example 4: (special command - two byte command, one byte response) Get Cycle # from battery B
- host sends A1 to 54h, if allowed
- host sends 11000001b to 50h, if allowed
- host reads the acknowledgement byte from the keyscan processor.
- At this point host may go & perform other tasks because a response to a **special gas gauge command can take as much as 20 seconds**.
- host sends A2 to 54h, if allowed
- host waits for b0 of status read @54h to go from 0 to 1
- host then reads 50h. This is the Gas Gauge Status Byte.
- the host repeats this "polling operation" until bit 7 of the response i.e. Gas Gauge Status changes from 0 to 1. b7 = 1 indicates to host that keyscan processor has obtained response to the previously sent special gas gauge command & it is waiting in the Gas gauge buffer.
- the host then sends A3 command to read 1 byte of the response. The reading by the host automatically clears bit 7 of the Gas Gauge Status byte.

The command should be followed by a data indicating channel # to read. Refer to to column labeled Formulae below for interpreting the responses.

Analog channel #	Function	Formulae
0	EXTPWR	EXTPWR in V = (data/ 255)*5 V
1	Vin_5V	VIN = (data/255)*5* (131.5/47) V
2	X stick	X stick = (data/255)*5 V
3	X stick	Y stick = (data/255)*5V
4	Right switch	Right switch = (data/255)*5 V
5	Left switch	Left swicth = (data/255)*5 V
6	CPU temperature	Temperature in degrees C = (data/255)*5000/10 °C
7	Exunit-	Exunit- = (data/255)*5 V

5.3.5 The Key Swapping

5.3.5.1 Caps Lock/Left Ctrl Swap

When enabled by the appropriate command, the Caps Lock key and the Left Ctrl key are swapped. This causes the Caps Lock key to produce scan codes as the Left Ctrl key normally does, and causes the Left Ctrl key to generate the scan codes normally produced by the Caps Lock key.

This includes the Fn-Left Control key sequence that generates either the Right Ctrl key scan code, or the Right Alt key scan code depending on the state of the Swap Right Alt/Right Ctrl special function. To use this key sequence, the Fn-Caps Lock keys would be pressed after swapping is enabled.

See the pseudocode following the next section for more information.

5.3.5.2 Right Alt/Right Ctrl Swap

When enabled by the appropriate command, the Right Alt key and the Right Ctrl key are swapped. This causes the Right Alt key to produce scan codes as the Right Ctrl key normally does, and causes the Fn-Left Ctrl key (or the Fn-Caps Lock key if the Caps Lock/Left Ctrl special function is enabled) to generate the scan codes normally produced by the Right Alt key.

```
;
;FILE=Thermal.Equ
;Watts (12/15/94)
;
;
;       tlevel IS IN DEGREE F
;
;;;TLEVEL0          EQU     08h                     ;
TLEVEL0         EQU     01h

TLEVEL1         EQU     0ah                     ;
TLEVEL2         EQU     0ch                     ;
TLEVEL3         EQU     0eh                     ;
TLEVEL4         EQU     11h                     ;
TLEVEL5         EQU     14h                     ;
TLEVEL6         EQU     17h                     ;
TLEVEL7         EQU     20h                     ;
;
THERMALREAD     equ     5       ;n minutes right now
IT              equ     THERMALREAD
TK              equ     MINUTE_RELOAD*IT        ;Number of ticks/interval
                                                        ;0 slice
TSLICE0         Equ     TSLICE7  ;was 0
TSLICE1         Equ     TK/(((TK)*TP1)/100)     ; 3% over n minutes
TSLICE2         Equ     TK/(((TK)*TP2)/100)     ; 5% over n minutes
TSLICE3         Equ     TK/(((TK)*TP3)/100)     ; 7% over n minutes
TSLICE4         Equ     TK/(((TK)*TP4)/100)     ;10% over 4 minutes
TSLICE5         Equ     TK/(((TK)*TP5)/100)     ;20% over 5 minutes
TSLICE6         Equ     TK/(((TK)*TP6)/100)     ;30% over 5 minutes
TSLICE7         Equ     TK/(((TK)*TP7)/100)     ;40% over 5 minutes
TP1             equ     50  ;90 tested
;;;TP1              EQU     05
TP2             EQU     10
TP3             EQU     15
TP4             EQU     20
TP5             EQU     30
TP6             EQU     35
TP7             EQU     50
```

EXHIBIT P